

CSIS

Center for Strategic and International Studies

1800 K Street N.W.

Washington, DC 20006

(202) 775-3270

(To comment: Acordesman@aol.com)

For Updates see CSIS.ORG, “Military Balance”)

If We Fight Iraq: Iraq and Its Weapons of Mass Destruction

Anthony H. Cordesman

Arleigh A. Burke Chair for Strategy

Center for Strategic and International Studies

Revised June 28, 2002

Table of Contents

IRAQ AND WEAPONS OF MASS DESTRUCTION	1
<i>Iraqi Developments and Possible Capabilities</i>	1
<i>A Current Warfighting Capability "Guesstimate:" US Response</i>	2
<i>A Current Warfighting Capability "Guesstimate:" Israeli Response</i>	3
<i>Future Risks and Breakout Problems</i>	3
CIA ESTIMATE OF IRAQI THREAT IN 2001	5
DEPARTMENT OF DEFENSE INTELLIGENCE ESTIMATE OF IRAQI THREAT: JANUARY 2001	7
<i>Objectives, Strategies, and Resources</i>	7
<i>Nuclear Program</i>	7
<i>Biological Program</i>	7
<i>Chemical Program</i>	8
<i>Ballistic Missiles</i>	8
<i>Cruise Missiles and Other Means of Delivery</i>	9
CIA COMMENTS ON THE IRAQI PROGRAM IN JANUARY 2002	10
OVERVIEW OF IRAQ: NBC AND MISSILE PROGRAMS	12
<i>Nuclear</i>	12
<i>Biological</i>	12
<i>Chemical</i>	12
<i>Ballistic Missiles</i>	12
<i>Other Means of Delivery Available</i>	12
IRAQI COVERT BREAK OUT CAPABILITIES	13
WHAT IS AT STAKE IN TERMS OF THE UNSCOM CRISIS IN IRAQ:	14
IRAQI BALLISTIC MISSILE PROGRAM	16
IRAQI CHEMICAL WARFARE PROGRAM	17
IRAQ'S MAJOR USES OF CHEMICAL WEAPONS 1983-1988	18
IRAQI BIOLOGICAL WARFARE PROGRAM	19
THE STATUS OF IRAQ NUCLEAR PROGRAM,	20
IRAQ'S SEARCH FOR WEAPONS OF MASS DESTRUCTION	22

Iraq and Weapons of Mass Destruction

Iraq has a much more serious history of proliferation than Iran. Iraq has seen proliferation as a counter to conventional superiority since the late 1960s. It sought weapons of mass destruction long before the Gulf War showed it what the "revolution in military affairs" and US conventional superiority could accomplish. Since 1991, Iraq has been unable to obtain significant imports of conventional weapons and it is incapable of producing its own. As a result, it is scarcely surprising that Iraq sees proliferation as its key potential method of countering the US advantage in conventional forces and has been willing to pursue such options in the face of massive economic costs, UNSCOM and IAEA efforts to destroy its remaining capabilities, and the extension of UN sanctions.

Iraqi Developments and Possible Capabilities

In spite of the Gulf War, and nearly eight years of UNSCOM efforts before Iraq forced an end to the UN inspection effort, Iraq still presents a major threat in terms of proliferation. It is all too clear that Iraq may have increased this threat since active UNSCOM and IAEA efforts ended in December 1998. Iraq continues to work on UCAVs and drones and has experimented with the modification of trainers and MiG-21s in this role. It developed crude "sprayer" tanks and systems for its aircraft and helicopters before the Gulf War, and may since have developed more effective ways of releasing chemical and biological agents in "line source" deliveries that would be an order of magnitude more lethal than release through conventional bombs and shells.

Iraq does have cluster bomb technology, and the theoretical engineering capability to use non-explosive release mechanisms like air bags to release chemical and biological munitions. It also must realize that its crude contact fusing, and chemical/biological warhead/bomb designs, drastically limited the effectiveness of its weapons. It has had strong incentives to correct these problems, but experts are deeply divided over the probability that Iraq has done so.

Similar critical uncertainties exist in other areas of Iraqi CBRN warfighting. Before the Gulf War, Iraq developed crude parachute release designs for its missile warheads, systems which would be substantially more effective than the primitive contact fuse warheads and bombs it had at the time of the war, and which might well have produced negligible weapons effects if they had ever been used. It has experimented with the conversion of biological agents into dry, coated micropowders that can be two orders of magnitude or more lethal than slurries of wet agents. They can achieve the lethality of simple nuclear fission weapons, and are far better suited to use in bombs, missile warheads, and covert attacks.

Several UNSCOM inspectors believe that Iraq created new parallel chemical and biological weapons design efforts that were unrelated to its prewar efforts no later than 1995, and may have been able to develop better VX weapons, more lethal forms of Anthrax and other non-infectious agents, and possibly weaponize Smallpox. Once again, Iraq has had strong incentives to correct the problems in its previous CBRN weapons, but experts are deeply divided over the probability that Iraq has done so.

IAEA and US intelligence experts privately put little or no faith in the claims of various Iraqi defectors that Iraq retains the ability to make fissile material, has extensive covert production facilities, and has workable bomb designs small enough to be used in missile warheads. IAEA experts note that the Iraqi diffusion effort was never effective, that the Calutron designs fell far short of meeting specification, and that Iraq's centrifuge designs proved to be far less effective during laboratory review than they initially estimated, and that Iraq does not seem to have understood the technical problems in using centrifuges to enrich beyond 90%. They note that cascades of centrifuges are relatively easy to conceal in multistory buildings, but that Iraq is extremely dependent on imports to create such a facility and would probably need outside technical support.

Iraq did, however, have at least two workable implosion designs that could be used in large bombs at the time of the Gulf War, had solved the technical problems in making and triggering high explosive lenses for nuclear weapons, and had workable neutron initiators. If it could obtain fissile material, it could probably make a large explosive device relatively quickly, but not fit one to a missile warhead or build a bomb that any of its aircraft other than its bombers and MiG-24s could deliver at long distances, particularly in low-altitude penetration missions. Iraq might be much more successful in arming any actual nuclear weapon it could obtain, particularly because of the relatively crude PAL systems fitted to many FSU weapons, and the duplicative code sequences used to arm them.

No one can dismiss the risk that Iraq does have weapons with very high real-world lethalties. UNSCOM inspectors also note that UNSCOM's claims to have identified 817 out of 819 Scud imports are extremely soft and may well have an error of 60 weapons, and that no accurate count exists of Iraqi produced components. This could

give Iraq a range of 20-80 operational Scuds and Iraq has shown in the past that it can produce its own TEL launchers.

A Current Warfighting Capability “Guesstimate:” US Response

These uncertainties make it extremely difficult to assess Iraq’s capabilities. As a guesstimate, Iraq’s present holdings of delivery systems, and chemical and biological weapons, seem most likely to be so limited in technology and operational lethality that they do not constrain US freedom of action, or do much to intimidate Iraq’s neighbors.

As a result, they would not be great enough to change Saudi, US, British, Iranian, Israeli and/or Southern Gulf perceptions of risk to the point where they would limit or paralyze military action by a US-led coalition. **Furthermore**, it seems unlikely that Iraq can **openly** build up major production and deployment capabilities without being detected and targeted and without provoking strong US counter-proliferation programs, including retaliatory strike capabilities.

Even if these guesses are correct, however, Iraq’s possession of even less effective CBRN weapons must affect US, British, Southern Gulf, and Israeli perceptions of the risks inherent in attacking Iraq. There seem to be two major scenarios where this would directly affect warfighting: A punitive attack on Iraq and a US-led coalition attack to change the regime.

Any major punitive US and British attack on Iraq would almost certainly target suspect Iraqi CBRN and delivery facilities. It is impossible to estimate the success of such attacks or how much US intelligence has improved since Desert Fox. The Bush Administration has begun to talk about preemption, but talk is cheap. Desert Fox was a near total failure with at most several successes in hitting large missile production facilities that were overt because they were permitted under the terms of the ceasefire. It is unclear that any other raids had any useful impact, particularly because most critical equipment could be rapidly dispersed or sheltered. There seem to be good reasons why the US military have never released any meaningful damage assessment data on Desert Fox, and it is all too possible that future attacks would be equally unsuccessful.

The situation would also be very different if Iraq detected the US developing a presence that could support a major land attack and coalition effort to overthrow the Iraqi regime and/or occupy Iraq. During the Gulf War, Iraq dispersed missiles and bombs to create a crude retaliatory strike capability to deliver CB weapons if the regime collapsed or lost the ability to command Iraq forces. It took major risks in collocating CB and conventional weapons and in dispersing such weapons without security protection. In spite of claims to the contrary, US and British forces were near total failures in their efforts to locate and target Iraqi missiles and CBRN weapons, and the US intelligence and air strike effort failed to characterize Iraqi facilities and capabilities and had no meaningful successes against disperse missiles.

It is unlikely that the US can count on detecting any future Iraqi preplanned launch on warning (LOW), launch under attack (LUA), or retaliatory force for the delivery of CBRN weapon unless Iraqi chose to signal this for deterrent purposes. It is equally unlikely that the US would be able to comprehensively target such efforts if they were detected. However, US intelligence and air strike capabilities may have advanced to the point where a major effort to provide continuing surveillance and strike capability over probable launch efforts could largely suppress or destroy much of the Iraqi force. Unfortunately, neither US nor British special forces seem to have made major efforts to improve their wide area coverage to support such an effort. The real-world capabilities of the improved Patriot and Arrow also involve major uncertainties, and much would depend on their readiness and deployment.

The end result is likely to be that Iraq would succeed in launching some CBRN strikes against US Coalition forces, targets in neighboring states, and/or Israel. If so, this would present the problem that Iraq would be using weapons it has had no way to operationally test with CB agents of unknown character, weaponization quality, and operational lethality. As a result, the defender could only characterize the weapon after it struck, which could take hours or days in the case of biological weapons and would not be able to characterize dissemination firmly except by observing the lethal effects.

- In the best case, US Coalition forces and neighboring states could easily ride out the resulting attack; it simply would not be lethal enough to force massive retaliation.
- In the more likely case, the Iraqi attack would at least be politically successful enough to force the same major diversion of US and other air strike and intelligence assets as during the Gulf War. This would not save the Iraqi regime, but it does mean the US must size its forces to cover this contingency and this would require major theater-wide air capabilities in excess of those needed for conventional warfighting.

- In the worst case, the US might be forced to threaten Iraq with a massive response and then execute it. The question then would be would the conventional destruction of Iraq's economy and infrastructure be rapid and drastic enough to persuade the loyalist elements operating the Iraqi force to stop. The same question would apply to any US threat or use of nuclear weapons, albeit at a far more drastic level.

A Current Warfighting Capability "Guesstimate:" Israeli Response

Israel has far more limited intelligence, surveillance, and targeting capabilities to cover all of Iraq than the US. Its air force is capable of effective long-range strikes against known targets, but cannot sustain a loitering or "kill box," type presence. In spite of various claims, its special forces have little real world capability to assist in targeting and destroying Iraqi forces disperse over wide areas, particularly with large numbers of decoys and rapid movement. Its land and air forces would also have to move over or through Jordan.

- In the best case, Israel could easily ride out the resulting attack; it simply would not be lethal enough to force massive retaliation. In such a case, Israel might carry out major conventional strikes against critical Iraqi military or economic targets to show its resolve. The impact this would actually have on the Arab world is easy to exaggerate. It would be carried out in the context of massive, ongoing US-led coalition air operations. It seems as likely that it would increase Arab pressure on the US to reach a rapid and decisive conclusion as actually inhibit operations.
- In the more likely case, Israel would have to decide whether to issue nuclear threats as well as execute conventional strikes on Iraq. Much would depend on how quickly and confidently Israel could characterize the nature and lethality of the Iraqi hits on Israel.
- In the worst case, Israel would face an existential threat to key urban areas like Tel Aviv and Haifa. Under these conditions, it might openly declare its nuclear deterrent and threaten nuclear retaliation against Iraqi cities and military forces in an effort to halt Iraqi action. If Iraqi should succeed in delivery extremely lethal biological agents against an Israeli city, Israel would probably massively retaliate against every Iraqi city not already occupied by US-led coalition forces. This could destroy Iraq as a state. Israel would also probably posture itself for hair trigger massive retaliation against any Syrian or Palestinian effort to exploit the Iraqi strikes.

Future Risks and Breakout Problems

If UN sanctions on Iraq are lifted or weaken sharply, Iraq may be able to rebuild its strategic delivery capabilities relatively quickly, and any sustained conflict involving weapons of mass destruction could have drastic consequences. This would be particularly true if Iraq could develop advanced biological weapons with near-nuclear lethality, or assemble nuclear devices with weapons grade fissile material bought from an outside source. There might be little or no warning of such strategic developments, and the US might not be willing to counter by extending theater nuclear deterrence to protect its Southern Gulf allies.

There are several other developments that might allow Iraq to use proliferation to pose a near-term threat to US conventional capabilities in the region:

- A successful Iraqi attempt to buy significant amounts of weapons grade material. This could allow Iraq to achieve a nuclear break out capability in a matter of months. Both the US and the region would find it much harder to adjust to such an Iraqi effort than to the slow development of nuclear weapons by creating fissile material in Iraq. It seems likely that the US could deal with the situation by extending a nuclear umbrella over the Gulf, but even so, the Southern Gulf states might be far more responsive to Iraqi pressure and intimidation. Most, after all, are so small that they are virtually "one bomb states;"
- A change in the US and regional perception of biological weapons. Biological weapons are now largely perceived as unproven systems of uncertain lethality. Regardless of their technical capabilities, they have little of the political impact of nuclear weapons. Iraq might, however, conduct live animal tests to demonstrate that its biological weapons have near-nuclear lethality or some other power might demonstrate their effectiveness in another conflict. The successful mass testing or use of biological weapons might produce a rapid "paradigm shift" in the perceived importance of such weapons and of Iraq's biological warfare programs;

- Iraq might break out of UN sanctions and reveal a more substantial capability than now seems likely. Paradoxically, such an Iraqi capability would help to legitimize Iran and Israel's nuclear, biological, and chemical programs and the escalation to the use of such weapons;
- Iraq might use such weapons through proxies or in covert attacks with some degree of plausible deniability. Terrorism and unconventional warfare would be far more intimidating if they made use of weapons of mass

CIA Estimate of Iraqi Threat in 2001

In Iraq Saddam Hussein has grown more confident in his ability to hold on to his power. He maintains a tight handle on internal unrest, despite the erosion of his overall military capabilities. Saddam's confidence has been buoyed by his success in quieting the Shia insurgency in the south, which last year had reached a level unprecedented since the domestic uprising in 1991. Through brutal suppression, Saddam's multilayered security apparatus has continued to enforce his authority and cultivate a domestic image of invincibility.

High oil prices and Saddam's use of the oil-for-food program have helped him manage domestic pressure. The program has helped meet the basic food and medicine needs of the population. High oil prices buttressed by substantial illicit oil revenues have helped Saddam ensure the loyalty of the regime's security apparatus operating and the few thousand politically important tribal and family groups loyal.

There are still constraints on Saddam's power. His economic infrastructure is in long-term decline, and his ability to project power outside Iraq's borders is severely limited, largely because of the effectiveness and enforcement of the No-Fly Zones. His military is roughly half the size it was during the Gulf War and remains under a tight arms embargo. He has trouble efficiently moving forces and supplies—a direct result of sanctions. These difficulties were demonstrated most recently by his deployment of troops to western Iraq last fall, which were hindered by a shortage of spare parts and transport capability.

Despite these problems, we are likely to see greater assertiveness—largely on the diplomatic front—over the next year. Saddam already senses improved prospects for better relations with other Arab states. One of his key goals is to sidestep the 10-year-old economic sanctions regime by making violations a routine occurrence for which he pays no penalty.

Saddam has had some success in ending Iraq's international isolation. Since August, nearly 40 aircraft have flown to Baghdad without obtaining UN approval, further widening fissures in the UN air embargo. Moreover, several countries have begun to upgrade their diplomatic relations with Iraq. The number of Iraqi diplomatic missions abroad are approaching pre-Gulf War levels, and among the states of the Gulf Cooperation Council, only Kuwait and Saudi Arabia have not reestablished ties.

Our most serious concern with Saddam Hussein must be the likelihood that he will seek a renewed WMD capability both for credibility and because every other strong regime in the region either has it or is pursuing it. For example, the Iraqis have rebuilt key portions of their chemical production infrastructure for industrial and commercial use. The plants he is rebuilding were used to make chemical weapons precursors before the Gulf War and their capacity exceeds Iraq's needs to satisfy its civilian requirements.

We have similar concerns about other dual-use research, development, and production in the biological weapons and ballistic missile fields; indeed, Saddam has rebuilt several critical missile production complexes.

Adapted from Statement by Director of Central Intelligence, George J. Tenet before the Senate Select Committee on Intelligence on the "Worldwide Threat 2001: National Security in a Changing World" (as prepared for delivery) 07 February 2001

Since Operation Desert Fox in December 1998, Baghdad has refused to allow United Nations inspectors into Iraq as required by Security Council Resolution 687. In spite of ongoing UN efforts to establish a follow-on inspection regime comprising the UN Monitoring, Verification, and Inspection Commission (UNMOVIC) and the IAEA's Iraq Action Team, no UN inspections occurred during this reporting period. Moreover, the automated video monitoring system installed by the UN at known and suspect WMD facilities in Iraq is no longer operating. Having lost this on-the-ground access, it is more difficult for the UN or the US to accurately assess the current state of Iraq's WMD programs.

Given Iraq's past behavior, it is likely that Iraq has used the period since Desert Fox to reconstitute prohibited programs. We assess that since the suspension of UN inspections in December of 1998, Baghdad has had the capability to reinstate both its CW and BW programs within a few weeks to months. Without an inspection-monitoring program, however, it is more difficult to determine if Iraq has done so.

Since the Gulf war, Iraq has rebuilt key portions of its chemical production infrastructure for industrial and commercial use, as well as its missile production facilities. It has attempted to purchase numerous dual-use items for, or under the guise of, legitimate civilian use. This equipment—in principle subject to UN scrutiny—also could

be diverted for WMD purposes. Since the suspension of UN inspections in December 1998, the risk of diversion has increased. After Desert Fox, Baghdad again instituted a reconstruction effort on those facilities destroyed by the US bombing, including several critical missile production complexes and former dual-use CW production facilities. In addition, Iraq appears to be installing or repairing dual-use equipment at CW-related facilities. Some of these facilities could be converted fairly quickly for production of CW agents.

UNSCOM reported to the Security Council in December 1998 that Iraq also continued to withhold information related to its CW program. For example, Baghdad seized from UNSCOM inspectors an Air Force document discovered by UNSCOM that indicated that Iraq had not consumed as many CW munitions during the Iran-Iraq war in the 1980s as had been declared by Baghdad. This discrepancy indicates that Iraq may have hidden an additional 6,000 CW munitions.

In 1995, Iraq admitted to having an offensive BW program and submitted the first in a series of Full, Final, and Complete Disclosures (FFCDs) that were supposed to reveal the full scope of its BW program. According to UNSCOM, these disclosures are incomplete and filled with inaccuracies. Since the full scope and nature of Iraq's BW program was not verified, UNSCOM had assessed that Iraq continued to maintain a knowledge base and industrial infrastructure that could be used to produce quickly a large amount of BW agents at any time, if the decision is made to do so. In the absence of UNSCOM or other inspections and monitoring since late 1998, we remain concerned that Iraq may again be producing biological warfare agents.

Iraq has continued working on its L-29 unmanned aerial vehicle (UAV) program, which involves converting L-29 jet trainer aircraft originally acquired from Eastern Europe. It is believed that Iraq has conducted flights of the L-29, possibly to test system improvements or to train new pilots. These refurbished trainer aircraft are believed to have been modified for delivery of chemical or, more likely, biological warfare agents.

We believe that Iraq has probably continued low-level theoretical R&D associated with its nuclear program. A sufficient source of fissile material remains Iraq's most significant obstacle to being able to produce a nuclear weapon. Although we were already concerned about a reconstituted nuclear weapons program, our concerns were increased last September when Saddam publicly exhorted his "Nuclear Mujahidin" to "defeat the enemy."

Iraq continues to pursue development of SRBM systems that are not prohibited by the United Nations and may be expanding to longer-range systems. Pursuit of UN-permitted missiles continues to allow Baghdad to develop technological improvements and infrastructure that could be applied to a longer-range missile program. We believe that development of the liquid-propellant Al-Samoud SRBM probably is maturing and that a low-level operational capability could be achieved in the near term — which is further suggested by the appearance of four Al Samoud transporter-erector-launchers (TELs) with airframes at the 31 December Al Aqsa Cal parade.

The solid-propellant missile development program may now be receiving a higher priority, and development of the Ababil-100 SRBM — two of such airframes and TELs were paraded on 31 December—and possibly longer range systems may be moving ahead rapidly. If economic sanctions against Iraq were lifted, Baghdad probably would increase its attempts to acquire missile-related items from foreign sources, regardless of any future UN monitoring and continuing restrictions on long-range ballistic missile programs. Iraq probably retains a small, covert force of Scud-type missiles.

Iraq's ACW acquisitions remain low due to the generally successful enforcement of the UN arms embargo. The weapons and ACW-related goods which have been delivered to Iraq tend to be smaller arms transported over porous land borders. Iraq continues, however, to aggressively seek ACW equipment and technology.

Adapted from Statement by Director of Central Intelligence, George J. Tenet, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 2000, Report of September 2001.

Department of Defense Intelligence Estimate of Iraqi Threat: January 2001

Objectives, Strategies, and Resources

Iraq believes NBC weapons and ballistic missiles are necessary if it is to reach its goal of being the dominant power in the region. Since the end of the Gulf War, Baghdad steadfastly resisted the terms of the cease-fire agreement, which required it to cooperate with the United Nations Special Commission (UNSCOM) and the IAEA in identifying and eliminating Iraq's NBC and theater ballistic missile capabilities. Iraq's policy of deception and denial sparked numerous confrontations with UNSCOM and the IAEA over the years and culminated with the allied bombing of Iraq under Operation Desert Fox in December 1998.

Since late 1998, Baghdad has refused to allow UN inspectors into Iraq as required by UN Security Council Resolutions (UNSCRs) 687, 707, 715 and 1284. (UNSCR 1284, adopted in December 1999, established a follow-on regime to UNSCOM called the United Nations Monitoring, Verification and Inspection Commission [UNMOVIC]). As a result, there have been no UN inspections for over two years, and the automated monitoring systems installed by the UN at known and suspected Iraqi NBC and missile facilities are no longer operational. This abeyance of on-site

inspections and our previous judgments about Iraqi intentions raise concerns that Iraq may have begun such reconstitution efforts and that it will again be able to threaten its neighbors. In support of these rebuilding efforts, Iraq is known to have attempted to purchase numerous dual-use items under the guise of legitimate civil use since the end of the Gulf War.

Iraq remains largely a petroleum-based economy. Prior to the 1990 Iraqi invasion of Kuwait, Iraq's petroleum sector accounted for 61 percent of its GDP and about \$14.5 billion in exports; per capita GDP was \$2,270. UN sanctions subsequently were imposed on Iraq, and since then there has been a significant decline in Iraqi economic output. Increased illegal petroleum product exports since 1996 and crude oil exports allowed by the UN since 1997 have led to significant growth in the industrial and petroleum sectors since 1996. However, under UNSCR 1284, Iraq can export any volume of petroleum for humanitarian needs. Nonetheless, inflation fluctuates wildly depending on supply and demand, the political situation, and regime market manipulation; inflation estimates range from 90 to almost 300 percent. While oil exports are still a dominant economic force in Iraq, Iraqi per capita GDP was reported to have dropped to \$587 by 1999. Despite these severe pressures on its economy, Saddam Hussein's government continues to devote Iraqi resources to rebuilding certain portions of its NBC weapons and missile infrastructure.

Nuclear Program

Iraq has ratified the NPT. Nevertheless, before the Gulf War, Iraq had a comprehensive nuclear weapons development program that was focused on building an implosion-type device. The program was linked to a ballistic missile project that was the intended delivery system. From April 1991 to December 1998, Iraqi nuclear aspirations were held in check by IAEA/ UNSCOM inspections and monitoring. All known weapons-grade fissile material was removed from the country. Although Iraq claims that it destroyed all of the specific equipment and facilities useful for developing nuclear weapons, it still retains sufficient skilled and experienced scientists and engineers as well as weapons design information that could allow it to restart a weapons program.

Iraq would need five or more years and key foreign assistance to rebuild the infrastructure to enrich enough material for a nuclear weapon. This period would be substantially shortened should Baghdad successfully acquire fissile material from a foreign source.

Biological Program

Iraq's continued refusal to disclose fully the extent of its biological program suggests that Baghdad retains a biological warfare capability, despite its membership in the BWC. After four and one-half years of claiming that it had conducted only "defensive research" on biological weapons Iraq declared reluctantly, in 1995, that it had produced approximately 30,000 liters of bulk biological agents and/or filled munitions. Iraq admitted that it produced anthrax, botulinum toxins and aflatoxins and that it prepared biological agent-filled munitions, including missile warheads and aerial bombs. However, UNSCOM believed that Iraq had produced substantially greater amounts than it has admitted—three to four times greater. Iraq also admitted that, during the Persian Gulf War, it had deployed biological agent-filled munitions to air-fields and that these weapons were intended for use against

Israel and coalition forces in Saudi Arabia. Iraq stated that it destroyed all of these agents and munitions in 1991, but it has provided insufficient credible evidence to support this claim.

The UN believes that Baghdad has the ability to reconstitute its biological warfare capabilities within a few weeks or months, and, in the absence of UNSCOM inspections and monitoring during 1999 and 2000, we are concerned that Baghdad again may have produced some biological warfare agents.

Chemical Program

Since the Gulf War, Baghdad has rebuilt key portions of its industrial and chemical production infrastructure; it has not become a state party to the CWC. Some of Iraq's facilities could be converted fairly quickly to production of chemical warfare agents. Following Operation Desert Fox, Baghdad again instituted a rapid reconstruction effort on those facilities to

include former dual-use chemical warfare-associated production facilities, destroyed by U.S. bombing. In 1999, Iraq may have begun installing or repairing dual-use equipment at these and other chemical war-fare-related facilities. Previously, Iraq was known to have produced and stockpiled mustard, tabun, sarin, and VX, some of which likely remain hidden. It is likely that an additional quantity of various precursor chemicals also remains hidden.

In late 1998, UNSCOM reported to the UN Security Council that Iraq continued to withhold information related to its chemical program. UNSCOM cited an example where Baghdad seized from inspectors a document discovered by UNSCOM inspectors, which indicated that Iraq had not consumed as many chemical munitions during the Iran-Iraq War as had been declared previously by Baghdad. This document suggests that Iraq may have an additional 6,000 chemical munitions hidden. Similarly, UNSCOM discovery in 1998 of evidence of VX in Iraqi missile warheads showed that Iraq had lied to the international community for seven years when it repeatedly said that it had never weaponized VX.

Iraq retains the expertise, once a decision is made, to resume chemical agent production within a few weeks or months, depending on the type of agent. However, foreign assistance, whether commercial procurement of dual-use technology, key infrastructure, or other aid, will be necessary to completely restore Iraq's chemical agent production capabilities to pre-Desert Storm levels. Iraqi doctrine for the use of chemical weapons evolved during the Iran-Iraq War, and was fully incorporated into Iraqi offensive operations by the end of the war in 1988. During different stages of that war, Iraq used aerial bombs, artillery, rocket launchers, tactical rockets, and sprayers mounted in helicopters to deliver agents against Iranian forces. It also used chemical agents against Kurdish elements of its own civilian population in 1988.

Ballistic Missiles

Iraq likely retains a limited number of launchers and SCUD-variant SRBMs capable of striking its neighbors, as well as the components and manufacturing means to assemble and produce others, anticipating the reestablishment of a long-range ballistic missile force sometime in the future. Baghdad likely also has warheads capable of delivering chemical or biological agents. While Iraq's missile production infrastructure was damaged during the December 1998 strikes, Iraq retains domestic expertise and sufficient infrastructure to support most missile component production, with the exception of a few critical subelements.

During 1999, Iraq continued to work on the two short-range ballistic missile systems that fall within the 150-kilometer range restriction imposed by the UN: the liquid-propellant Al Samoud and the solid-propellant Ababil-100. The Al-Samoud is essentially a scaled-down SCUD, and work on it allows Baghdad to develop technological capabilities that could be applied to a longer-range missile program. We believe that the Al Samoud missile, as designed by the Iraqis, has an inherent potential to exceed the 150-kilometers range restriction imposed under UNSCR 687. Iraqi personnel involved with pre-Desert Storm ballistic missile efforts are working on the Ababil-100 SRBM program.

Once economic sanctions against Iraq are lifted, unless restricted by future UN monitoring, Baghdad probably will begin converting these efforts into longer-range missile systems. Despite the damage done to Iraq's missile infrastructure during the Gulf War, Desert Fox, and subsequent UNSCOM activities, Iraq may have ambitions for longer-range missiles, including an ICBM. Depending on the success of acquisition efforts and degree of foreign support, it is possible that Iraq could develop and test an ICBM capable of reaching the United States by 2015.

Cruise Missiles and Other Means of Delivery

Iraq may have a very limited stockpile of land-launched short-range anti-ship cruise missiles and air-launched short-range tactical missiles that it purchased from China and France prior to the Gulf War.

These are potential means of delivery for NBC weapons. Iraq also has a variety of fighter aircraft, helicopters, artillery, and rockets available as potential means of delivery for NBC weapons, although their operational status is questionable due to the cumulative effects of the UN arms embargo. However, Iraq has continued to work on its UAV program, which involves converting L-29 jet trainer aircraft originally acquired from Eastern Europe. These modified and refurbished L-29s may be intended for the delivery of chemical or biological agents. In the future, Iraq may try to use its research and development infrastructure to produce its own UAVs and cruise missiles or, should the UN arms embargo be lifted, it could try to purchase cruise missiles.

Source: Adapted by Anthony H. Cordesman from Secretary of Defense William S. Cohen, Proliferation: Threat and Response, Washington DC, Department of Defense, January 2001

CIA Comments on the Iraqi Program in January 2002

- A CIA report in January 2002 estimated that,
 - Baghdad's goal of becoming the predominant regional power and its hostile relations with many of its neighbors are the key drivers behind Iraq's ballistic missile program. Iraq has been able to maintain the infrastructure and expertise necessary to develop missiles, and the IC believes it has retained a small, covert force of Scud-type missiles, launchers, and Scud-specific production equipment and support apparatus. For the next several years at least, Iraq's ballistic missile initiatives probably will focus on reconstituting its pre-Gulf war capabilities to threaten regional targets and probably will not advance beyond MRBM systems.
 - Prior to the Gulf war, Iraq had several programs to extend the range of the Scud
 - SRBM and became experienced working with liquid-propellant technology. Since the Gulf war, despite UN resolutions limiting the range of Iraq's missiles to 150 km, Baghdad has been able to maintain the infrastructure and expertise necessary to develop longer range missile systems.
 - A military parade in December 2000 showcased Al Samoud missiles on new transporter-erector-launchers (TELs). The liquid-propellant Al-Samoud SRBM probably will be deployed soon.
 - The IC assesses that Iraq retains a small covert force of Scud-variant missiles, launchers, and conventional, chemical, and biological warheads.
- We cannot project with confidence how long UN-related sanctions and prohibitions will remain in place. They plausibly will constrain Iraq during the entire period of this Estimate. Scenarios that would weaken the prohibitions several years from now also are conceivable, allowing Iraq to reconstitute its missile infrastructure and begin developing long-range missiles before the end of the decade. The discussion that follows addresses developments that *could* and are *likely* to occur should UN prohibitions be significantly weakened in the future.
- Iraq is likely to use its experience with Scud technology to resume production of the pre-Gulf war 650-km-range Al Hussein, the 900-km-range Al Abbas, or other Scud variants, and it could explore clustering and staging options to reach more distant targets. Iraq *could* resume Scud-variant production—with foreign assistance—quickly after UN prohibitions ended.
- With substantial foreign assistance, Baghdad *could* flight-test a domestic MRBM by mid-decade. This possibility presumes rapid erosion of UN prohibitions and Baghdad's willingness to risk detection of developmental steps, such as static engine testing, earlier. An MRBM flight test is *likely* by 2010. An imported MRBM *could* be flight-tested within months of acquisition.
- For the first several years after relief from UN prohibitions, Iraq probably will strive to reestablish its SRBM inventory to pre-Gulf war numbers, continue developing and deploying solid-propellant systems, and pursue MRBMs to keep pace with its neighbors. Once its regional security concerns are being addressed, Iraq may pursue a first-generation ICBM/SLV.
- Although Iraq *could* attempt before 2015 to test a rudimentary long-range missile based on its failed Al-Abid SLV, such a missile almost certainly would fail. Iraq is unlikely to make such an attempt. After observing North Korean missile developments the past few years, Iraq would be more likely to pursue a three-stage TD-2 approach to an SLV or ICBM, which would be capable of delivering a nuclear weapon-sized payload to the United States. Some postulations for potential Iraqi ICBM/SLV concepts and timelines from the beginning of UN prohibition relief include:
 - If Iraq could buy a TD-2 from North Korea, it *could* have a launch capability within a year or two of a purchase.
 - It *could* develop and test a TD-1-type system within a few years.
 - If it acquired No Dong from North Korea, it *could* test an ICBM within a few years of acquisition by clustering and staging the No Dong—similar to the clustering of Scuds for the Al Abid SLV.
 - If Iraq bought TD-2 engines, it *could* test an ICBM within about five years of the acquisition.
 - Iraq *could* develop and test a Taepo Dong-2-type system within about ten years of a decision to do so.
- Most agencies believe that Iraq is *unlikely* to test before 2015 any ICBMs that would threaten the United States, even if UN prohibitions were eliminated or significantly reduced in the next few years. Some believe that if prohibitions were eliminated in the next few years, Iraq would be *likely* to test an ICBM probably masked as an SLV before 2015, possibly before 2010. In this view, foreign assistance would affect the timing and the capability of the missile.
- Foreign assistance is key to Iraqi efforts to develop quickly longer range missiles. Iraq relied on extensive foreign assistance before the Gulf war and will continue to seek foreign assistance to expand its current capabilities.

- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002:
 - On the missile side, the proliferation of ICBM and cruise missile designs and technology has raised the threat to the US from WMD delivery systems to a critical threshold. As outlined in our recent National Intelligence Estimate on the subject, most Intelligence Community agencies project that by 2015 the US most likely will face ICBM threats from North Korea and Iran, and possibly from Iraq. This is in addition to the longstanding missile forces of Russia and China. Short- and medium-range ballistic missiles pose a significant threat now.
 - Several countries of concern are also increasingly interested in acquiring a land-attack cruise missile (LACM) capability. By the end of the decade, LACMs could pose a serious threat to not only our deployed forces, but possibly even the US mainland.
 - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.

Overview of Iraq: NBC and Missile Programs

Nuclear

- Had comprehensive nuclear weapons development program prior to Operation Desert Storm. Infrastructure suffered considerable damage from Coalition bombing and IAEA dismantlement.
- Retains scientists, engineers, and nuclear weapons design information; without fissile material, would need five or more years and significant foreign assistance to rebuild program and produce nuclear devices; less time would
- be needed if sufficient fissile material were acquired illicitly.
- Ratified the NPT; has not signed the CTBT.

Biological

- Produced and weaponized significant quantities of biological warfare agents prior to Desert Storm.
- Admitted biological warfare effort in 1995, after four years of denial; claimed to have destroyed all agents, but
- offered no credible proof.
- May have begun program reconstitution in absence of UN inspections and monitoring.
- Acceded to the BWC.

Chemical

- Rebuilt some of its chemical production infrastructure allegedly for commercial use.
- UNSCOM discovered evidence of VX persistent nerve agent in missile warheads in 1998, despite Iraqi denials for
- seven years that it had not weaponized VX.
- May have begun program reconstitution in absence of UN inspections and monitoring.
- Has not signed the CWC.

Ballistic Missiles

- Probably retains limited number of SCUD-variant missiles, launchers, and warheads capable of delivering
- biological and chemical agents. Retains significant missile production capability.
- Continues work on liquid- and solid-propellant SRBMs (150 kilometers) allowed by UNSCR 687; likely will use
- technical experience gained for future longer range missile development effort.
- Not a member of the MTCR.

Other Means of Delivery Available

- Land-launched anti-ship cruise missiles; air-launched tactical missiles; none have NBC warheads; stockpile likely
- is very limited.
- Air systems: fighters, helicopters, UAVs.
- Ground systems: artillery, rockets.

Iraqi Covert Break Out Capabilities

- UNSCOM and the IAEA's success have created new priorities for Iraqi proliferation. The UN's success in destroying the large facilities Iraq needs to produce fissile materials already may well have led Iraq to focus on covert cell-like activities to manufacture highly lethal biological weapons as a substitute for nuclear weapons.
- All of the biological agents Iraq had at the time of the Gulf War seem to have been "wet" agents with limited storage life and limited operational lethality. Iraq may have clandestinely carried out all of the research necessarily to develop a production capability for dry, storage micro-power weapons which would be far easier to clandestinely stockpile, and have much more operational lethality.
- Iraq did not have advanced binary chemical weapons and most of its chemical weapons used unstable ingredients. Iraq has illegally imported specialized glassware since the Gulf War, and may well have developed advanced binary weapons and tested them in small numbers. It may be able to use a wider range of precursors and have developed plans to produce precursors in Iraq. It may have improved its technology for the production of VX gas.
- Iraq is likely to covertly exploit Western analyses and critiques of its pre-war proliferation efforts to correct many of the problems in the organization of its proliferation efforts, its weapons design, and its organization for their use.
- Iraq bombs and warheads were relatively crude designs which did not store chemical and biological agents well and which did a poor job of dispersing them. Fusing and detonation systems did a poor job of ensuring detonation at the right height and Iraq made little use of remote sensors and weather models for long-range targeting and strike planning. Iraq could clandestinely design and test greatly improve shells, bombs, and warheads. The key tests could be conducted using towers, simulated agents, and even indoors. Improved targeting, weather sensors, and other aids to strike planning are dual-use or civil technologies that are not controlled by UNSCOM. The net impact would weapons that could be 5-10 times more effective than the relatively crude designs Iraq had rushed into service under the pressure of the Iran-Iraq War.
- UNSCOM and the IAEA's success give Iraq an equally high priority to explore ways of obtaining fissile material from the FSU or other potential supplier country and prepare for a major purchase effort the moment sanctions and inspections are lifted and Iraq has the hard currency to buy its way into the nuclear club. Iraq could probably clandestinely assemble all of the components of a large nuclear device except the fissile material, hoping to find some illegal source of such material.
- The components for cruise missiles are becoming steadily more available on the commercial market, and Iraq has every incentive to create a covert program to examine the possibility of manufacturing or assembling cruise missiles in Iraq.
- UN inspections and sanctions may also drive Iraq to adopt new delivery methods ranging from clandestine delivery and the use of proxies to sheltered launch-on-warning capabilities designed to counter the US advantage in airpower.
- Iraq can legally maintain and test missiles with ranges up to 150 kilometers. This allows for exoatmospheric reentry testing and some testing of improved guidance systems. Computer simulation, wind tunnel models, and production engineering tests can all be carried out clandestinely under the present inspection regime. It is possible that Iraq could develop dummy or operational high explosive warheads with shapes and weight distribution of a kind that would allow it to test concepts for improving its warheads for weapons of mass destruction. The testing of improved bombs using simulated agents would be almost impossible to detect as would the testing of improved spray systems for biological warfare.
- Iraq has had half a decade in which to improve its decoys, dispersal concepts, dedicated command and control links, targeting methods, and strike plans. This kind of passive warfare planning is impossible to forbid and monitor, but ultimately is as important and lethal as any improvement in hardware.
- There is no evidence that Iraq made an effort to develop specialized chemical and biological devices for covert operations, proxy warfare, or terrorist use. It would be simple to do so clandestinely and they would be simple to manufacture.

What is At Stake in Terms of the UNSCOM Crisis in Iraq:

Summary of the Iraqi Threat Reported in the Note by the Secretary General, "Report of the Secretary-General on the Activities of the Special Commission,"

S/1997/774, October 6, 1997

- Analysis had shown that Iraq had destroyed 83 of the 85 missiles it had claimed were destroyed. at the same time, it stated that Iraq had not given an adequate account of its proscribed missile assets, including launchers, warheads, and propellants. It also stated that Tariq Aziz, Iraq's Deputy Prime Minister, "gave an explicit order in the presence of the Executive Chairman, to the Iraqi experts not to discuss such issues with the Chairman."
- Iraq had continued to lie regarding the way in which it has destroyed its pre-war inventory of missile launchers, and major uncertainties remained over its holdings of biological and chemical missile warheads. Iraq initially claimed that it had 45 missile warheads filled with chemical weapons in 1992. It then stated that it had 20 chemical and 25 biological warheads in 1995. UNSCOM established that it had a minimum of 75 operational warheads and 5 used for trials. It has evidence of the existence of additional warheads. It can only verify that 16 warheads were filled with Sarin, and 34 with chemical warfare binary components, and that 30 were destroyed under its supervision -- 16 with Sarin and 14 with binary components. Iraq again failed to provide documentation on this issue in September, 1997.
- It continued to conceal documents describing its missile propellants, and the material evidence relating to its claims to have destroyed its indigenous missile production capabilities indicated in might has destroyed less than a tenth of what it claimed.
- "The Commission identified some other areas of concern related to Iraq's chemical weapons program. The most important among them are the accounting for special missile warheads intended for filling with chemical or biological warfare agent, the material balance of some 550 155 mm mustard gas shells, the extent of VX programs, and the rationale for the acquisition of various types of chemical weapons."
- UNSCOM stated that it had been able to destroy 120 pieces of additional equipment for the production of chemical weapons that Iraq had only disclosed in August, 1997. Major uncertainties still existed regarding some 4,000 tons of declared precursors for chemical weapons, the production of several hundred tons of additional chemical warfare agents, the consumption of chemical precursors, and Iraq's claims to have unilaterally destroyed some 130 tons of chemical warfare agents. Major uncertainties existing regarding 107,500 empty casings for chemical weapons, whether several thousand additional chemical weapons were filled with agents, the unilateral destruction of 15, 620 weapons, and the fate of 16,038 additional weapons Iraq claimed it had discarded. "The margin of error" in the accounting presented by Iraq is in the neighborhood of 200 munitions."
- The uncertainties affecting the destruction of VX gas affect some 750 tons of imported precursor chemicals, and 55 tons of domestically produced precursors. Iraq has made unverifiable claims that 460 tons were destroyed by Coalition air attacks, and that it unilaterally destroyed 212 tons. UNSCOM has only been able to verify the destruction of 155 tons out of this latter total, and destroy a further 36 tons on its own. Iraq systematically lied about the existence of its production facilities for VX gas until 1995, and made "significant efforts" to conceal its production capabilities after that date.
- "Iraq has not provided physical evidence (relating to) binary artillery munitions and aerial bombs, chemical warheads for short range missiles, cluster aerial bombs, and spray tanks." Iraq has claimed these were only prototype programs, but there is no current way to know how many were deployed as weapons.
- "Until July, 1995, Iraq totally denied it had any offensive biological warfare program. Since then, Iraq has presented three versions of FFCDs and four "drafts." The most recent FFCD was presented by Iraq on 11 September 1997. This latest submission followed the Commission's rejection, in April 1997, of the previous FFCD of June 1996...In the period since that report, the Commission conducted eight inspections in an attempt to investigate critical areas of Iraq's proscribed activities such as warfare agent production and destruction, biological munitions manufacturing, filling and destruction, and military involvement in and support to the proscribed program. Those investigations, along with documents and other evidence available to the Commission, confirmed the assessment that the June 1996 declaration was deeply deficient....The new FFCD, received on 11 September 1997, contains fewer errata and is more coherent. However, with regard to the important issues...the report contains no significant changes from the June 1996 FFCD. ...the Commission's

questions are rephrased to in order to avoid having to produce direct answers, or are answer incompletely, or are ignored completely...Little of the information the Commission has gathered since June 1996 has been incorporated into the new document.”

- Iraq has never provided a clear picture of the role of its military in its biological warfare program, and has claimed it only played a token role. It has never accounted for its disposal of growth media. “Media unaccounted for is sufficient, in quantity, for the production of over three times more of the biological agent -- Anthrax -- stated by Iraq to have been produced...Bulk warfare agent production appears to be vastly understated by Iraq...Experts calculations of possible agent production quantities, either by equipment capacity or growth media amounts, far exceed Iraq’s stated results....Significant periods when the fermenters were claimed not to be utilized are unexplained.”
- Iraq’s accounting for its Aflatoxin production is not credible. Biological warfare field trials are underreported and inadequately described. Claims regarding field trials of chemical and biological weapons using R400 bombs are contradictory and indicate that, “more munitions were destroyed than were produced.” No documentation has been provided on munitions filling. The account of Iraq’s unilateral destruction of bulk biological agents is “incompatible with the facts...The Commission is unable to verify that the unilateral destruction of the BW-filled Al Hussein warheads has taken place.”
- There is no way to confirm whether Iraq destroyed 157 bombs of the R400 type, some of which were filled with Botulin or anthrax spores.
- “The September 1997 FFCD fails to give a remotely credible account of Iraq’s biological program. This opinion has been endorsed by an international panel of experts.”

Iraqi Ballistic Missile Program

Item	Initial Inventory	Comments
Soviet supplied Scud Missiles (includes Iraqi Modifications of the Al-Husayn with a range of 650 km and the Al-Abbas with a range of 950 km)	819	<p>UNSCOM accepts Iraqi accounting for all but two of the original 819 Scud missiles acquired from the Soviet Union. Iraq hasn't explained the disposition of major components that it may have stripped from operational missiles before their destruction, and some Iraqi claims-- such as the use of 14 Scuds in ATBM tests- are not believable.</p> <p>Inspectors indicate that at least 60 of the 817 total were not Really accounted for.</p> <p>Gaps in Iraqi declarations and Baghdad's failure to fully account for indigenous missile programs strongly suggest that Iraq retains a small missile force.</p>
Iraqi-Produced Scud Missiles	Unknown	Iraq denied producing a completed Scud missile, but it produced/procured and tested all major subcomponents.
Iraqi-Produced Scud Warheads	120	Iraq claims all 120 were used or destroyed. UNSCOM supervised the destruction of 15. Recent UNSCOM inspections found additional CW/BW warheads beyond those currently admitted.
Iraqi-Produced Scud Airframes	2	Iraq claims testing 2 indigenous airframes in 1990. It is unlikely that Iraq produced only 2 Scud airframes.
Iraqi-Produced Scud Engines	80	Iraq's claim that it melted 63 engines following acceptance tests--53 of which failed quality controls-- are unverifiable and not believable. UNSCOM is holding this as an open issue.
Soviet-Supplied Missile Launchers	11	UNSCOM doubts Iraq's claim that it unilaterally destroyed 5 launchers. The Soviet Union may have sold more than the declared 11 launchers.
Iraqi-Produced Missile Launchers	8	Iraq has the capability to produce additional launchers.

Adapted by Anthony H. Cordesman from material provided by the NSC on February 19, 1998.

Iraqi Chemical Warfare Program

CW Agent Stockpiles (In Metric tons)

CW Agent	Chemical Agents Declared by Iraq	Potential CW Agents based on Unaccounted Precursors ^{1.)}	Comments
VX	At least 4	200	Iraq denied producing VX until Husayn Kamil's defection in 1995
G-agents (Sarin)	100-150	200	Figures include both weaponized and bulk agents
Mustard	500-600	200	Figures include both weaponized and bulk agents.

CW Delivery Systems (In Numbers of Weapons Systems)

Delivery System	Estimated Numbers Before the Gulf War	Munitions Unaccounted for ^{2.)}	Comments
Missile Warheads Al-Husayn (Modified Scud B)	75-100	45-70	UNSCOM supervised the destruction of 30 warheads
Rockets	100,000	15,000-25,000	UNSCOM supervised the destruction of
Aerial bombs	16,000	2,000	
Artillery Shells	30,000	15,000	
Aerial Spray Tanks	Unknown	Unknown	

1.) These estimates are very rough. They are derived from reports provided by UNSCOM to the Security Council and to UNSCOM plenary meetings. Gaps in Iraqi disclosures strongly suggest that Baghdad is concealing chemical munitions and precursors. Iraq may also retain a small stockpile of filled munitions. Baghdad has the capability to quickly resume CW production at known dual-use facilities that currently produce legitimate items, such as pharmaceuticals and pesticides. UNSCOM has supervised the destruction of some 45 different types of CW precursors (1,800,000 liters of liquid and 1,000,000 kg of solid).

2.) All these munitions could be used to deliver CW or BW agents. The numbers for missile warheads include 25 that Iraq claims to have unilaterally destroyed after having filled them with biological agents during the Gulf war. UNSCOM has been unable to verify the destruction of these warheads.

Adapted by Anthony H. Cordesman from material provided by the NSC on February 19, 1998.

Iraq's Major Uses of Chemical Weapons 1983-1988

<u>Date</u>	<u>Area</u>	<u>Type of Gas</u>	<u>Approximate Casualties</u>	<u>Target</u>
August 1983	Haij Umran	Mustard	Less than 100	Iranians/Kurds
October-November 1983	Panjwin	Mustard	3,0000	Iranians/Kurds
February-March 1984	Majnoon Island	Mustard	2,500	Iranians
March 1984	Al Basrah	Tabun	50- 100	Iranians
March 1985	Hawizah Marsh	Mustard/Tabun	3,000	Iranians
February 1996	Al Faw	Mustard/Tabun	8,000-10,000	Iranians
December 1986	Umm ar Rasas	Mustard	1,000s	Iranians
April 1987	Al Basrah	Mustard/Tabun	5,000	Iranians
October 1987	Sumar/Mehran	Mustard/Nerve Agents	3,000	Iranians
March 1988	Halabjah	Mustard/Nerve Agents	Hundreds	Iranians/Kurds

Note: Iranians also used poison gas at Halabjah and may have caused some of the casualties.

Source: Adapted from material provided by the NSC on February 19, 1998.

Iraqi Biological Warfare Program

BW Agent Production Amounts

BW Agent	Declared Concentrated Amounts	Declared Total Amounts	Comments
Anthrax (Bacillus anthracis)	8,500 liters (2,245 gallons) (22,557 gallons)	85,000 liters (100,396 gallons)	UNSCOM estimates production amounts were actually 3-4 times more than the declared amounts, but is unable to confirm.
Botulinum toxin (Clostridium Botulinum)	19,400 liters (10x and 20x concentrated) (5,125 gallons)	380,000 liters (100,396 gallons)	UNSCOM estimates production amounts Were actually 2 times more than the Declared amounts, but is unable to confirm.
Gas Gangrene (Clostridium perfringens)	340 liters (90 gallons)	3,400 liters (900 gallons)	Production amounts could be higher, but UNSCOM is unable to confirm.
Aflatoxin (Aspergillus flavus and Aspergillus parasiticus)	N/A	2,200 liters (581 gallons)	Production amounts and time frame of production claimed by Iraq do not correlate.
Ricin (Castor Bean plant)	N/A	10 liters (2.7 gallons)	Production amounts could be higher, but UNSCOM is unable to confirm.

BW-Filled and Deployed Delivery Systems

Delivery System	Anthrax	Botulinum Toxin	Aflatoxin	Comments
Missile warheads Al-Husayn (modified Scud B)	5	16	4	UNSCOM cannot confirm the unilateral Destruction of these 25 warheads due to conflicting accounts provided by Iraq.
R-400 aerial bombs	50	100	7	Iraq claimed unilateral destruction of 157 Bombs, but UNSCOM is unable to confirm this number. UNSCOM has found the remains of at least 23.
Aircraft aerosol spray tanks may F-1 Mirage modified fuel drop tank	4			Iraq claims to have produced 4, but Have manufactured others.

BW Agent Growth Media

Media	Quantity Imported	Unaccounted For Amounts
BW Agent Growth Media	31,000 kg (68,200 lbs.)	3,500 kg (7,700 lbs.)

Total refers to the amount of material obtained from production process, while *concentrated* refers to the amount of concentrated agent obtained after final filtration/purification. The *concentrated* number is the amount used to fill munitions.

Media refers to the substance used to provide nutrients for the growth and multiplication of micro-organisms.

Adapted by Anthony H. Cordesman from material provided by the NSC on February 19, 1998.

The Status of Iraq Nuclear Program,

- UN teams have found and destroyed, or secured, new stockpiles of illegal enriched material, major production and R&D facilities, and equipment-- including Calutron enriching equipment. The IAEA carried out more than 500 site inspections during its time in Iraq, destroyed more than 50,000 square meters of factory space, 2,000 equipment items and 600 metric tons of special alloys. It put all known stocks of Uranium compounds under IAEA control.
- UNSCOM believes that Iraq's nuclear program has been largely disabled and remains incapacitated, but warns that Iraq retains substantial technology and established a clandestine purchasing system in 1990 that it has used to import forbidden components since the Gulf War.
- The IAEA findings at the end of the IAEA effort were:
 - There were no indications of successful development of nuclear weapons.
 - However, no documentation exists to show the final status of the weapons effort at the time it was interrupted.
 - Iraq was closed to success in production of HEU through the EMIS process, had produced and carried out pilot cascading of single cylinder subcritical gas centrifuge machines, and fabrication of the explosive package for a nuclear weapon and associated electronics.
 - All known imported and indigenous Uranium compounds are in the custody of the IAEA, and all known indigenous facilities capable of producing amounts of uranium compounds useful to a nuclear weapons effort have been destroyed.
 - There are no indications that Iraq produced more than a few grams of weapons-usable material, all of which has been removed from Iraq. All safeguard material Iraq had diverted to its "crash" weapons effort has been verified and removed from Iraq, including all safeguard research reactor fuel. There are no indications that Iraq has acquired weapons grade material from any other sources.
 - All relevant single-use industrial scale enrichment production and research equipment has been destroyed. All known dual-use equipment is subject to ongoing monitoring and verification.
 - All EMIS-related facilities and equipment have been destroyed.
- Work by David Albright indicates that Iraq still holds approximately 1.7 metric tons (MT) of low-enriched uranium (LEU) and several hundred MT of natural uranium. He estimates that if Iraq should master one of the uranium enrichment technologies that it was pursuing before the Gulf War, its LEU stock would provide a means to rapidly make enough HEU for at least one nuclear weapon, and that the natural uranium could become the feedstock for many more. This uranium remains in Iraq because the UN Action Team did not have a mandate under resolution 687 to "remove, destroy or render harmless" this uranium. Without further enrichment or irradiation in a nuclear reactor, it is not "weapons-usable nuclear material."
- Dr. Khidhir Hamza a highest-ranking Iraqi scientist who defected from Iraq claims Iraqi scientists were commanded to build one nuclear bomb immediately after Saddam invaded Kuwait in 1990, and that the resulting device was crude and untested and might even could fall apart. In an April 2, 2001 edition of Middle East Forum Wire, he says that,
 - Iraq still runs its nuclear program and distributes its nuclear program infrastructure among dozens of small corporations, as it does with biological and chemical weapons.
 - One group was responsible for enrichment of uranium by diffusion, and did this under the front of a large refinery in Baghdad. A refinery and a uranium enrichment plant require similar piping, structures, compressors, and handling of gases. He says
 - His assistant, who designed bombs under Hamza, is now running the program while also doing seismic prospecting for oil maps. Apart from designing weapons, he engineers underground explosions that generate seismic waves in order to locate oil. When an inspector visits, all programs relating to the bomb design are put aside, and replaced with seismic prospecting maps. The bomb designer is a real expert at seismic prospecting, so he is very convincing to the inspectors.
 - In a 1998, New York Times interview, he stated that Iraq was three years away from nuclear capability. Sadly, inspections ceased that same year. Three years have passed, and Saddam is undoubtedly on the precipice of nuclear power.
 - He now estimates that Iraq will have between three to five nuclear weapons by 2005. Iraq now has twelve tons of uranium and 1.3 tons of low enriched uranium. This is enough for at least four bombs already.

- IAEA inspectors feel that Iraqi exiles have little credibility, but note that there is no way to detect basic weapons research, development and testing of weaponization electronics, further work on explosive packages for weapons, simulations using depleted Iranium, development and testing of single centrifuges and experimental cascades, and development of Uranium casting and machine techniques using depleted Uranium.
- A Department of Defense report in January 2001 stated that,
 - Despite these severe pressures on its economy, Saddam Hussein's government continues to devote Iraqi resources to rebuilding certain portions of its development program that was focused on building an implosion-type device. The program was linked to a ballistic missile project that was the intended delivery system. From April 1991 to December 1998, Iraqi nuclear aspirations were held in check by IAEA/ UNSCOM inspections and monitoring. All known weapons-grade fissile material was removed from the country.
 - Although Iraq claims that it destroyed all of the specific equipment and facilities useful for developing nuclear weapons, it still retains sufficient skilled and experienced scientists and engineers as well as weapons design information that could allow it to restart a weapons program.
 - Iraq would need five or more years and key foreign assistance to rebuild the infrastructure to enrich enough material for a nuclear weapon. This period would be substantially shortened should Baghdad successfully acquire fissile material from a foreign source.
- The CIA estimated in January 2002 that Baghdad had a crash program to develop a nuclear weapon for missile delivery in 1990, but coalition bombing and IAEA and UNSCOM activities significantly set back the effort. The Intelligence Community estimates that Iraq, unconstrained, would take several years to produce enough fissile material to make a weapon. Iraq has admitted to having biological and chemical weapons programs before the Gulf war and maintains those programs.
- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002: We believe Saddam never abandoned his nuclear weapons program. Iraq retains a significant number of nuclear scientists, program documentation, and probably some dual-use manufacturing infrastructure that could support a reinvigorated nuclear weapons program. Baghdad's access to foreign expertise could support a rejuvenated program, but our major near-term concern is the possibility that Saddam might gain access to fissile material.
- The major remaining uncertainties are:
 - Iraq still retains the technology developed before the Gulf War and US experts believe an ongoing research and development effort continues, in spite of the UN sanctions regime.
 - Did Iraq conceal an effective high speed centrifuge program.
 - Are there elements for radiological weapons.
 - Is it actively seeking to clandestinely buy components for nuclear weapons and examining the purchase of fissile material from outside Iraq.
 - Is it continuing with the development of a missile warhead suited to the use of a nuclear device.
 - A substantial number of declared nuclear weapons components and research equipment has never been recovered. There is no reason to assume that Iraqi declarations were comprehensive.

Source: Prepared by Anthony H. Cordesman, Arleigh A. Burke Chair in Strategy, CSIS.

Iraq's Search for Weapons of Mass Destruction

Delivery Systems

- Prior to the Gulf War Iraq had extensive delivery systems incorporating long-range strike aircraft with refueling capabilities and several hundred regular and improved, longer-range Scud missiles, some with chemical warheads. These systems included:
 - Tu-16 and Tu-22 bombers.
 - MiG-29 fighters.
 - Mirage F-1, MiG-23BM, and Su-22 fighter attack aircraft.
 - A Scud force with a minimum of 819 missiles.
- Extended range Al Husayn Scud variants (600 kilometer range) extensively deployed throughout Iraq, and at three fixed sites in northern, western, and southern Iraq.
- Developing Al-Abbas missiles (900 kilometer range), which could reach targets in Iran, the Persian Gulf, Israel, Turkey, and Cyprus.
- Long-range super guns with ranges of up to 600 kilometers.
- Iraq also engaged in efforts aimed at developing the Tamuz liquid fueled missile with a range of over 2,000 kilometers, and a solid fueled missile with a similar range. Clear evidence indicates that at least one design was to have a nuclear warhead.
- Iraq tested its first chemically armed missile warhead in the third quarter of 1985.
- Iraq carried out a major series of missile attacks on Iran in the "war of the cities" in 1996-1998, and struck at Saudi and Israeli targets in 1991. It fired five missiles with 230 kilogram concrete "penetrator" warheads at the Israeli nuclear reactor in Dimona in 1991.
- Iraq attempted to conceal a plant making missile engines from the UN inspectors. It only admitted this plant existed in 1995, raising new questions about how many of its missiles have been destroyed.
- Iraq had design work underway for a nuclear warhead for its long-range missiles.
- The Gulf War deprived Iraq of some of its MiG-29s, Mirage F-1s, MiG-23BMs, and Su-22s.
- Since the end of the war, the UN inspection regime has also destroyed many of Iraq's long-range missiles:
- UNSCOM has directly supervised the destruction of 48 Scud-type missiles.
- It has verified the Iraqi unilateral destruction of 83 more missiles and 9 mobile launchers.
- A State Department summary issued on November 16, 1998, indicates that UNSCOM has supervised the destruction of:
 - 48 operational missiles;
 - 14 conventional missile warheads;
 - six operational mobile launchers; 28 operational fixed launch pads;
 - 32 fixed launch pads;
 - 30 missile chemical warheads;
 - other missile support equipment and materials, and a variety of assembled and non-assembled supergun components.
 - 38,537 filled and empty chemical munitions;
 - 90 metric tons of chemical weapons agent;
 - more than 3,000 metric tons of precursor chemicals;
 - 426 pieces of chemical weapons production equipment; and,
 - 91 pieces of related analytical instruments.
- The entire al-Hakam biological weapons production facility and a variety of production equipment and materials.
- The UN estimates that it is able to account for 817 of the 819 long-range missiles that Iraq imported in the period ending in 1988:

- Pre-1980 expenditures, such as training 8
- Expenditures during the Iran-Iraq War (1980-1981), including the war
 - of the cities in February-April 1988 516
- Testing activities for the development of Iraq's modifications of
 - imported missiles and other experimental activities (1985-1990) 69
- Expenditures during the Gulf War (January-March 1991) 93
- Destruction under the supervision of UNSCOM 48
- Unilateral destruction by Iraq (mid-July and October 1991) 83
- UNSCOM's analysis has shown that Iraq had destroyed 83 of the 85 missiles it had claimed were destroyed. at the same time, it stated that Iraq had not given an adequate account of its proscribed missile assets, including launchers, warheads, and propellants.
- UNSCOM also reports that it supervised the destruction of 10 mobile launchers, 30 chemical warheads, and 18 conventional warheads.
- Iraq maintains a significant delivery capability consisting of:
 - HY-2, SS-N-2, and C-601 cruise missiles, which are unaffected by UN cease-fire terms.
 - FROG-7 rockets with 70 kilometer ranges, also allowed under UN resolutions.
 - Multiple rocket launchers and tube artillery.
 - Experimental conversions such as the SA-2.
- Iraq claims to have manufactured only 80 missile assemblies, 53 of which were unusable. UNSCOM claims that 10 are unaccounted for.
- US experts believe Iraq may still have components for several dozen extended-range Scud missiles.
- In addition, Iraq has admitted to:
 - Hiding its capability to manufacture its own Scuds.
 - Developing an extended range variant of the FROG-7 called the Laith. The UN claims to have tagged all existing FROG-7s to prevent any extension of their range beyond the UN imposed limit of 150 kilometers for Iraqi missiles.
 - Experimenting with cruise missile technology and ballistic missile designs with ranges up to 3,000 kilometers.
 - Flight testing Al Husayn missiles with chemical warheads in April 1990.
 - Developing biological warheads for the Al Husayn missile as part of Project 144 at Taji.
 - Initiating a research and development program for a nuclear warhead missile delivery system.
 - Successfully developing and testing a warhead separation system.
 - Indigenously developing, testing, and manufacturing advanced rocket engines to include liquid-propellant designs.
 - Conducting research into the development of Remotely Piloted Vehicles (RPVs) for the dissemination of biological agents.
 - Attempting to expand its Ababil-100 program designed to build surface-to-surface missiles with ranges beyond the permitted 100-150 kilometers.
 - Importing parts from Britain, Switzerland, and other countries for a 350 mm "super gun," as well as starting an indigenous 600 mm supergun design effort.
- Iraq initially claimed that it had 45 missile warheads filled with chemical weapons in 1992. It then stated that it had 20 chemical and 25 biological warheads in 1995. UNSCOM established that it had a minimum of 75 operational warheads and 5 used for trials. It has evidence of the existence of additional warheads. It can only verify that 16 warheads were filled with Sarin, and 34 with chemical warfare binary components, and that 30 were destroyed under its supervision -- 16 with Sarin and 14 with binary components.
- US and UN officials conclude further that:

- Iraq is trying to rebuild its ballistic missile program using a clandestine network of front companies to obtain the necessary materials and technology from European and Russian firms.
- This equipment is then concealed and stockpiled for assembly concomitant with the end of the UN inspection regime.
- The equipment clandestinely sought by Iraq includes advanced missile guidance components, such as accelerometers and gyroscopes, specialty metals, special machine tools, and a high-tech, French-made, million-dollar furnace designed to fabricate engine parts for missiles.
- Recent major violations and smuggling efforts:
- In November, 1995, Iraq was found to have concealed an SS-21 missile it had smuggled in from Yemen.
- Jordan found that Iraq was smuggling missile components through Jordan in early December, 1995. These included 115 gyroscopes in 10 crates, and material for making chemical weapons. The shipment was worth an estimated \$25 million. Iraq claimed the gyroscopes were for oil exploration but they are similar to those used in the Soviet SS-N-18 SLBM. UNSCOM also found some gyroscopes dumped in the Tigris.
- Iraq retains the technology it acquired before the war and evidence clearly indicates an ongoing research and development effort, in spite of the UN sanctions regime.
- The fact the agreement allows Iraq to continue producing and testing short-range missiles (less than 150 kilometers range) means it can retain significant missile development effort.
- The SA-2 is a possible test bed. UNSCOM has tagged all missiles and monitors all high apogee tests
- Iraq's Al-Samoud and Ababil-100 programs are newer test beds.
- The Al-Samoud is a scaled-down Scud which Iraq has tested six times since September 1997. It uses a Volga-based liquid fueled engine (a scaled down Scud engine). Known tests reached ranges of only 134 kilometers but UNSCOM inspectors believe it has rapid growth potential to 300 kilometers and could be clustered to provide a large booster. The estimated CEP is 30 meters.
- The Al Ababil 100 is a solid-fuel test bed using a composite solid motor: AP, HTPB, probably AL
- Iraq has designed SLV systems in violation of UNSCR 687 which could be used as a springboard for a much longer-range missile program.
- Iraq continues to expand its missile production facility at Ibn Al Haytham, which has two new buildings large enough to make much longer-range missiles.
- US satellite photographs reveal that Iraq has rebuilt its Al-Kindi missile research facility.
- Ekeus reported on December 18, 1996 that Iraq retained missiles, rocket launchers, fuel, and command system to "make a missile force of significance". UNSCOM reporting as of October, 1997 is more optimistic, but notes that Iraq, "continued to conceal documents describing its missile propellants, and the material evidence relating to its claims to have destroyed its indigenous missile production capabilities indicated in might has destroyed less than a tenth of what it claimed"
- The CIA reported in January 1999 that Iraq is developing two ballistic missiles that fall within the UN-allowed 150-km range restriction. The Al Samoud liquid-propellant missile—described as a scaled-down Scud—began flight-testing in 1997.
- Technicians for Iraq's pre-war Scud missiles are working on the Al Samoud program and, although under UNSCOM supervision, are developing technological improvements that could be applied to future longer-range missile programs. The Ababil-100 solid-propellant missile is also under development, although progress on this system lags the Al Samoud. After economic sanctions are lifted and UN inspections cease, Iraq could utilize expertise from these programs in the development of longer-range missile systems.
- A State Department report in September 1999 noted that:
 - Iraq has refused to credibly account for 500 tons of SCUD propellant, over 40 SCUD biological and conventional warheads, 7 Iraqi-produced Scuds, and truckloads of SCUD components.
 - Iraq refuses to allow inspection of thousands of Ministry of Defense and Military Industries Commission documents relating to biological and chemical weapons and long-range missiles.
- The CIA estimated in September 1999 that although the Gulf war and subsequent United Nations activities destroyed much of Iraq's missile infrastructure, Iraq could test an ICBM capable of reaching the United States during the next 15 years.
 - After observing North Korean activities, Iraq *most likely would pursue* a three-stage Taepo Dong-2 approach to an ICBM (or SLV), which could deliver a several-hundred kilogram payload to parts of the United States. If Iraq could

buy a Taepo Dong-2 from North Korea, it *could have a launch capability* within months of the purchase; if it bought Taepo Dong engines, it *could test* an ICBM by the middle of the next decade. Iraq probably would take until the end of the next decade to develop the system domestically.

- Although much less likely, most analysts believe that if Iraq were to begin development today, it *could test* a much less capable ICBM in a few years using Scud components and based on its prior SLV experience or on the Taepo Dong-1.
- If it could acquire No Dong from North Korea, Iraq *could test* a more capable ICBM along the same lines within a few years of the No Dong acquisition.
- Analysts differ on the likely timing of Iraq's first flight test of an ICBM that could threaten the United States. Assessments include *unlikely* before 2015; and *likely* before 2015, possibly before 2010—foreign assistance would affect the capability and timing.
- The DCI Nonproliferation Center (NPC) reported in February 2000 that Iraq has continued to work on the two SRBM systems authorized by the United Nations: the liquid-propellant Al-Samoud, and the solid-propellant Ababil-100. The Al-Samoud is essentially a scaled-down Scud, and the program allows Baghdad to develop technological improvements that could be applied to a longer range missile program. We believe that the Al-Samoud missile, as designed, is capable of exceeding the UN-permitted 150-km-range restriction with a potential operational range of about 180 kilometers. Personnel previously involved with the Condor II/Badr-2000 missile—which was largely destroyed during the Gulf war and eliminated by UNSCOM—are working on the Ababil-100 program. Once economic sanctions against Iraq are lifted, Baghdad probably will begin converting these efforts into longer range missile systems, unless restricted by future UN monitoring.
- Defense intelligence experts say on background that Iraq has rebuilt many of the facilities the US struck in Desert Fox, including 12 factories and sites associated with missile construction and the production of weapons of mass destruction. These are said to include the missile facilities at Al Taji.
- US intelligence reports in June 2000 indicated that Iraq has resumed testing of missiles under 150 kilometers in range, possibly the system modified from the SA-2. They say that the system is not ready for deployment, and that there are problems with the rocket motor, guidance system, and there is no evidence Iraq is ready to start production.
- In late June 2000, Iraq was reported to have carried out eight tests of the Al Samoud missile
- A CIA report in August 2000 summarized the state of missile development in Iraq as follows,
 - Since the Gulf war, Iraq has rebuilt key portions of its chemical production infrastructure for industrial and commercial use, as well as its missile production facilities. It has attempted to purchase numerous dual-use items for, or under the guise of, legitimate civilian use. This equipment—in principle subject to UN scrutiny—also could be diverted for WMD purposes. Since the suspension of UN inspections in December 1998, the risk of diversion has increased.
 - Following Desert Fox, Baghdad again instituted a reconstruction effort on those facilities destroyed by the US bombing, to include several critical missile production complexes and former dual-use CW production facilities. In addition, it appears to be installing or repairing dual-use equipment at CW-related facilities. Some of these facilities could be converted fairly quickly for production of CW agents.
 - Iraq continues to pursue development of two SRBM systems which are not prohibited by the United Nations: the liquid-propellant Al-Samoud, and the solid-propellant Ababil-100. The Al-Samoud is essentially a scaled-down Scud, and the program allows Baghdad to develop technological improvements that could be applied to a longer range missile program. We believe that the Al-Samoud missile, as designed, is capable of exceeding the UN-permitted 150-km-range restriction with a potential operational range of about 180 kilometers. Personnel previously involved with the Condor II/Badr-2000 missile—which was largely destroyed during the Gulf war and eliminated by UNSCOM—are working on the Ababil-100 program. If economic sanctions against Iraq were lifted, Baghdad probably would attempt to convert these efforts into longer range missile systems, regardless of continuing UN monitoring and continuing restrictions on WMD and long-range missile programs.
- A Department of Defense report in January 2001 reported that,
 - Iraq likely retains a limited number of launchers and SCUD-variant SRBMs capable of striking its neighbors, as well as the components and manufacturing means to assemble and produce others, anticipating the reestablishment of a long-range ballistic missile force sometime in the future. Baghdad likely also has warheads capable of delivering chemical or biological agents. While Iraq's missile production infrastructure was damaged during the December 1998 strikes, Iraq retains domestic expertise and sufficient infrastructure to support most missile component production, with the exception of a few critical subelements.
 - During 1999, Iraq continued to work on the two short-range ballistic missile systems that fall within the 150-kilometer range restriction imposed by the UN: the liquid-propellant Al Samoud and the solid-propellant Ababil-100. The Al-Samoud is essentially a scaled-down SCUD, and work on it allows Baghdad to develop technological capabilities that

could be applied to a longer-range missile program. We believe that the Al Samoud missile, as designed by the Iraqis, has an inherent potential to exceed the 150-kilometers range restriction imposed under UNSCR 687.

- Iraqi personnel involved with pre-Desert Storm ballistic missile efforts are working on the Ababil-100 SRBM program. Once economic sanctions against Iraq are lifted, unless restricted by future UN monitoring, Baghdad probably will begin converting these efforts into longer-range missile systems. Despite the damage done to Iraq's missile infrastructure during the Gulf War, Desert Fox, and subsequent UNSCOM activities, Iraq may have ambitions for longer-range missiles, including an ICBM.
- Depending on the success of acquisition efforts and degree of foreign support, it is possible that Iraq could develop and test an ICBM capable of reaching the United States by 2015. Cruise Missiles and Other Means of Delivery Iraq may have a very limited stockpile of land-launched short-range anti-ship cruise missiles and air-launched short-range tactical missiles that it purchased from China and France prior to the Gulf War. These are potential means of delivery for NBC weapons.
- Iraq also has a variety of fighter aircraft, helicopters, artillery, and rockets available as potential means of delivery for NBC weapons, although their operational status is questionable due to the cumulative effects of the UN arms embargo. However, Iraq has continued to work on its UAV program, which involves converting L-29 jet trainer aircraft originally acquired from Eastern Europe. These modified and refurbished L-29s may be intended for the delivery of chemical or biological agents. In the future, Iraq may try to use its research and development infrastructure to produce its own UAVs and cruise missiles or, should the UN arms embargo be lifted, it could try to purchase cruise missiles.
- A CIA report in January 2002 estimated that,
 - Baghdad's goal of becoming the predominant regional power and its hostile relations with many of its neighbors are the key drivers behind Iraq's ballistic missile program. Iraq has been able to maintain the infrastructure and expertise necessary to develop missiles, and the IC believes it has retained a small, covert force of Scud-type missiles, launchers, and Scud-specific production equipment and support apparatus. For the next several years at least, Iraq's ballistic missile initiatives probably will focus on reconstituting its pre-Gulf war capabilities to threaten regional targets and probably will not advance beyond MRBM systems.
 - Prior to the Gulf war, Iraq had several programs to extend the range of the Scud
 - SRBM and became experienced working with liquid-propellant technology. Since the Gulf war, despite UN resolutions limiting the range of Iraq's missiles to 150 km, Baghdad has been able to maintain the infrastructure and expertise necessary to develop longer range missile systems.
 - A military parade in December 2000 showcased Al Samoud missiles on new transporter-erector-launchers (TELs). The liquid-propellant Al-Samoud SRBM probably will be deployed soon.
 - The IC assesses that Iraq retains a small covert force of Scud-variant missiles, launchers, and conventional, chemical, and biological warheads.
 - We cannot project with confidence how long UN-related sanctions and prohibitions will remain in place. They plausibly will constrain Iraq during the entire period of this Estimate. Scenarios that would weaken the prohibitions several years from now also are conceivable, allowing Iraq to reconstitute its missile infrastructure and begin developing long-range missiles before the end of the decade. The discussion that follows addresses developments that *could* and are *likely* to occur should UN prohibitions be significantly weakened in the future.
 - Iraq is likely to use its experience with Scud technology to resume production of the pre-Gulf war 650-km-range Al Hussein, the 900-km-range Al Abbas, or other Scud variants, and it could explore clustering and staging options to reach more distant targets. Iraq *could* resume Scud-variant production—with foreign assistance—quickly after UN prohibitions ended.
 - With substantial foreign assistance, Baghdad *could* flight-test a domestic MRBM by mid-decade. This possibility presumes rapid erosion of UN prohibitions and Baghdad's willingness to risk detection of developmental steps, such as static engine testing, earlier. An MRBM flight test is *likely* by 2010. An imported MRBM *could* be flight-tested within months of acquisition.
 - For the first several years after relief from UN prohibitions, Iraq probably will strive to reestablish its SRBM inventory to pre-Gulf war numbers, continue developing and deploying solid-propellant systems, and pursue MRBMs to keep pace with its neighbors. Once its regional security concerns are being addressed, Iraq may pursue a first-generation ICBM/SLV.
 - Although Iraq *could* attempt before 2015 to test a rudimentary long-range missile based on its failed Al-Abid SLV, such a missile almost certainly would fail. Iraq is unlikely to make such an attempt. After observing North Korean missile developments the past few years, Iraq would be more likely to pursue a three-stage TD-2 approach to an SLV

or ICBM, which would be capable of delivering a nuclear weapon-sized payload to the United States. Some postulations for potential Iraqi ICBM/SLV concepts and timelines from the beginning of UN prohibition relief include:

- If Iraq could buy a TD-2 from North Korea, it *could* have a launch capability within a year or two of a purchase.
- It *could* develop and test a TD-1-type system within a few years.
- If it acquired No Dongs from North Korea, it *could* test an ICBM within a few years of acquisition by clustering and staging the No Dongs—similar to the clustering of Scuds for the Al Abid SLV.
- If Iraq bought TD-2 engines, it *could* test an ICBM within about five years of the acquisition.
- Iraq *could* develop and test a Taepo Dong-2-type system within about ten years of a decision to do so.
- Most agencies believe that Iraq is *unlikely* to test before 2015 any ICBMs that would threaten the United States, even if UN prohibitions were eliminated or significantly reduced in the next few years. Some believe that if prohibitions were eliminated in the next few years, Iraq would be *likely* to test an ICBM probably masked as an SLV before 2015, possibly before 2010. In this view, foreign assistance would affect the timing and the capability of the missile.
- Foreign assistance is key to Iraqi efforts to develop quickly longer-range missiles. Iraq relied on extensive foreign assistance before the Gulf war and will continue to seek foreign assistance to expand its current capabilities.
- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002:
 - On the missile side, the proliferation of ICBM and cruise missile designs and technology has raised the threat to the US from WMD delivery systems to a critical threshold. As outlined in our recent National Intelligence Estimate on the subject, most Intelligence Community agencies project that by 2015 the US most likely will face ICBM threats from North Korea and Iran, and possibly from Iraq. This is in addition to the longstanding missile forces of Russia and China. Short- and medium-range ballistic missiles pose a significant threat now.
 - Several countries of concern are also increasingly interested in acquiring a land-attack cruise missile (LACM) capability. By the end of the decade, LACMs could pose a serious threat to not only our deployed forces, but possibly even the US mainland.
 - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.
- Iraq maintains a large purchasing network with some 100 middlemen and 150 known import companies. It has past contact with more than 500 foreign companies and has made purchases in 43 countries.

Chemical Weapons

- Iraq is the only major recent user of weapons of mass destruction. US intelligence sources report the following Iraqi uses of chemical weapons:

<u>Date</u>	<u>Area</u>	<u>Type of Gas</u>	<u>Approximate Casualties</u>	<u>Target</u>
August 1983	Haij Umran	Mustard	Less than 100	Iranians/Kurds
October-November 1983	Panjwin	Mustard	3,0000	Iranians/Kurds
February-March 1984	Majnoon Island	Mustard	2,500	Iranians
March 1984	Al Basrah	Tabun	50- 100	Iranians
March 1985	Hawizah Marsh	Mustard/Tabun	3,000	Iranians
February 1996	Al Faw	Mustard/Tabun	8,000-10,000	Iranians
December 1986	Umm ar Rasas	Mustard	1,000s	Iranians
April 1987	Al Basrah	Mustard/Tabun	5,000	Iranians

October 1987	Sumar/Mehran	Mustard/Nerve Agents	3,000	Iranians
March 1988	Halabjah	Mustard/Nerve Agents	Hundreds	Iranians/Kurds

Note: Iranians also used poison gas at Halabjah and may have caused some of the casualties.

- In revelations to the UN, Iraq admitted that, prior to the Gulf War, it:
 - Procured more than 1,000 key pieces of specialized production and support equipment for its chemical warfare program.
 - Maintained large stockpiles of mustard gas, and the nerve agents Sarin and Tabun.
 - Produced binary Sarin filled artillery shells, 122 mm rockets, and aerial bombs.
 - Manufactured enough precursors to produce 70 tons (70,000 kilograms) of the nerve agent VX. These precursors included 65 tons of choline and 200 tons of phosphorous pentasulfide and di-isopropylamine
 - Tested Ricin, a deadly nerve agent, for use in artillery shells.
 - Had three flight tests of long-range Scuds with chemical warheads.
 - Had a large VX production effort underway at the time of the Gulf War. The destruction of the related weapons and feedstocks has been claimed by Iraq, but not verified by UNSCOM. Iraq seems to have had at least 3,800 kilograms of V-agents by time the of the Gulf War, and 12-16 missile warheads.
- The majority of Iraq's chemical agents were manufactured at a supposed pesticide plant located at Muthanna. Various other production facilities were also used, including those at Salman Pak, Samara, and Habbiniyah. Though severely damaged during the war, the physical plant for many of these facilities has been rebuilt.
- Iraq possessed the technology to produce a variety of other persistent and non-persistent agents.
- The Gulf War and the subsequent UN inspection regime may have largely eliminated some of stockpiles and reduced production capability.
- During 1991-1994, UNSCOM supervised the destruction of:
 - 38,537 filled and unfilled chemical munitions.
 - 690 tons of chemical warfare agents.
 - More than 3,000 tons of precursor chemicals.
 - Over 100 pieces of remaining production equipment at the Muthan State Establishment, Iraq's primary CW research, production, filling and storage site.
- Since that time, UNSCOM has forced new disclosures from Iraq that have led to:
 - The destruction of 325 newly identified production equipment, 120 of which were only disclosed in August, 1997.
 - The destruction of 275 tons of additional precursors.
 - The destruction of 125 analytic instruments.
 - The return of 91 analytic pieces of equipment to Kuwait.
- As of February, 1998, UNSCOM had supervised the destruction of a total of:
 - 40,000 munitions, 28,000 filled and 12,000 empty.
 - 480,000 liters of chemical munitions
 - 1,800,000 liters of chemical precursors.
 - eight types of delivery systems including missile warheads.
- US and UN experts believe Iraq has concealed significant stocks of precursors. Iraq also appears to retain significant amounts of production equipment dispersed before, or during, Desert Storm and not recovered by the UN.
- UNSCOM reports that Iraq has failed to account for
 - Special missile warheads intended for filling with chemical or biological warfare agent.

- The material balance of some 550 155 mm mustard gas shells, the extent of VX programs, and the rationale for the acquisition of various types of chemical weapons
- 130 tons of chemical warfare agents.
- Some 4,000 tons of declared precursors for chemical weapons,
- The production of several hundred tons of additional chemical warfare agents, the consumption of chemical precursors,
- 107,500 empty casings for chemical weapons,
- Whether several thousand additional chemical weapons were filled with agents,
- The unilateral destruction of 15, 620 weapons, and the fate of 16,038 additional weapons Iraq claimed it had discarded. "The margin of error" in the accounting presented by Iraq is in the neighborhood of 200 munitions."
- Iraq systematically lied about the existence of its production facilities for VX gas until 1995, and made "significant efforts" to conceal its production capabilities after that date. Uncertainties affecting the destruction of its VX gas still affect some 750 tons of imported precursor chemicals, and 55 tons of domestically produced precursors. Iraq has made unverifiable claims that 460 tons were destroyed by Coalition air attacks, and that it unilaterally destroyed 212 tons. UNSCOM has only been able to verify the destruction of 155 tons and destroy a further 36 tons on its own.
- Iraq has developed basic chemical warhead designs for Scud missiles, rockets, bombs, and shells. Iraq also has spray dispersal systems.
- Iraq maintains extensive stocks of defensive equipment.
- The UN feels that Iraq is not currently producing chemical agents, but Iraq has offered no evidence that it has destroyed its VX production capability and/or stockpile. Further, Iraq retains the technology it acquired before the war and evidence clearly indicates an ongoing research and development effort, in spite of the UN sanctions regime.
- Recent UNSCOM work confirms that Iraq did deploy gas-filled 155 mm artillery and 122 mm multiple rocket rounds into the rear areas of the KTO during the Gulf War.
- Iraq's chemical weapons had no special visible markings, and were often stored in the same area as conventional weapons.
- Iraq has the technology to produce stable, highly lethal VX gas with long storage times.
- May have developed improved binary and more stable weapons since the Gulf War.
- Since 1992, Iraq attempted to covertly import precursors and production equipment for chemical weapons through Qatar, Saudi Arabia, and Jordan since the Gulf War.
- The current status of the Iraqi program is as follows (according to US intelligence as of February 19, 1998 and corrected by the National Intelligence Council on November 16, 1998):

<u>Agent</u>	<u>Declared</u>	Potential Unaccounted <u>For</u>	<u>Comments</u>
<u>Chemical Agents</u>	(Metric Tons)	(Metric Tons)	
VX Nerve Gas	3	300	Iraq lied about the program until 1995
G Agents (Sarin)	100-150	200	Figures include weaponized and bulk agents
Mustard Gas	500-600	200	Figures include weaponized and bulk agents
<u>Delivery Systems</u>	(Number)	(Number)	
Missile Warheads	75-100	2-25	UNSCOM supervised destruction of 30
Rockets	100,000	15,000-25,000	UNSCOM supervised destruction of 40,000, 28,000 of which were filled.
Aerial Bombs	16,000	2,000-8,000	High estimate reflects the data found in an Iraqi Air Force document in July, 1998.
Artillery shells	30,000	15,000	
Aerial Spray Tanks	?	?	

- A US State Department spokesman reported on November 16, 1998 that Iraq has reported making 8,800 pounds (four tons) of VX nerve gas, 220,000 pounds (100 tons) to 330,000 pounds (150 tons) of nerve agents such as Sarin and 1.1 million pounds (500 tons) to 1.32 million pounds (600 tons) of mustard gas. Data from UN weapons inspectors indicates that Iraq

may have produced an additional 1.32 million pounds (600-tons) of these agents, divided evenly among the three. "In other words, these are the differences between what they say they have and what we have reason to believe they have."

- UNSCOM reported to the Security Council in December 1998 that Iraq continued to withhold information related to its CW and BW programs.
 - For example, Baghdad seized from UNSCOM inspectors an Air Force document discovered by UNSCOM that indicated that Iraq had not consumed as many CW munitions during the Iran-Iraq War in the 1980s as had been declared by Baghdad. This discrepancy indicates that Iraq may have an additional 6,000 CW munitions hidden.
 - We do not have any direct evidence that Iraq has used the period since Desert Fox to reconstitute its WMD programs, although given its past behavior, this type of activity must be regarded as likely. We assess that since the suspension of UN inspections in December of 1998, Baghdad has had the capability to reinitiate both its CW and BW programs within a few weeks to months, but without an inspection monitoring program, it is difficult to determine if Iraq has done so. We know, however, that Iraq has continued to work on its unmanned aerial vehicle (UAV) program, which involves converting L-29 jet trainer aircraft originally acquired from Eastern Europe. These modified and refurbished L-29s are believed to be intended for delivery of chemical or biological agents.
- The CIA reported in January 1999 that Iraq had purchased numerous dual-use items for legitimate civilian projects—in principle subject to UN scrutiny—that also could be diverted for WMD purposes. Since the Gulf war, Baghdad has rebuilt key portions of its chemical production infrastructure for industrial and commercial use. Some of these facilities could be converted fairly quickly for production of CW agents. The recent discovery that Iraq had weaponized the advanced nerve agent VX and the convincing evidence that fewer CW munitions were consumed during the Iran-Iraq war than Iraq had declared provide strong indications that Iraq retains a CW capability and intends to reconstitute its pre-Gulf war capability as rapidly as possible once sanctions are lifted.
- A State Department report in September 1999 noted that:
 - In July 1998, Iraq seized from the hands of UNSCOM inspectors an Iraqi Air Force document indicating that Iraq had misrepresented the expenditure of over 6,000 bombs which may have contained over 700 tons of chemical agent. Iraq continues to refuse to provide this document to the UN.
 - Iraq continues to deny weaponizing VX nerve agent, despite the fact that UNSCOM found VX nerve agent residues on Iraqi SCUD missile warhead fragments. Based on its investigations, international experts concluded that "Iraq has the know-how and process equipment, and may possess precursors to manufacture as much as 200 tons of VX ... The retention of a VX capability by Iraq cannot be excluded by the UNSCOM international expert team."
 - The DCI Nonproliferation Center (NPC) reported in February 2000 that "We do not have any direct evidence that Iraq has used the period since Desert Fox to reconstitute its WMD programs, although given its past behavior, this type of activity must be regarded as likely. The United Nations assesses that Baghdad has the capability to reinitiate both its CW and BW programs within a few weeks to months, but without an inspection monitoring program, it is difficult to determine if Iraq has done so." It also reported that,
 - Since Operation Desert Fox in December 1998, Baghdad has refused to allow United Nations inspectors into Iraq as required by Security Council Resolution 687. As a result, there have been no UN inspections during this reporting period, and the automated video monitoring system installed by the UN at known and suspect WMD facilities in Iraq has been dismantled by the Iraqis. Having lost this on-the-ground access, it is difficult for the UN or the US to accurately assess the current state of Iraq's WMD programs.
 - Since the Gulf war, Iraq has rebuilt key portions of its chemical production infrastructure for industrial and commercial use, as well as its missile production facilities. It has attempted to purchase numerous dual-use items for, or under the guise of, legitimate civilian use. This equipment-in principle subject to UN scrutiny-also could be diverted for WMD purposes. Following Desert Fox, Baghdad again instituted a reconstruction effort on those facilities destroyed by the US bombing, to include several critical missile production complexes and former dual-use CW production facilities. In addition, it appears to be installing or repairing dual-use equipment at CW-related facilities. Some of these facilities could be converted fairly quickly for production of CW agents.
 - The United Nations Special Commission on Iraq (UNSCOM) reported to the Security Council in December 1998 that Iraq continued to withhold information related to its CW and BW programs. For example, Baghdad seized from UNSCOM inspectors an Air Force document discovered by UNSCOM that indicated that Iraq had not consumed as many CW munitions during the Iran-Iraq War in the 1980s as declared by Baghdad. This discrepancy indicates that Iraq may have an additional 6,000 CW munitions hidden. This intransigence on the part of Baghdad ultimately led to the Desert Fox bombing by the US.
 - Iraqi defector claims in February 2000 that Iraq had maintained a missile force armed with chemical and biological warheads that can be deployed from secret locations, and they that warheads are stored separately near Baghdad and have been deployed to the missiles in the field in exercises.ii

- A CIA report in August 2000 summarized the state of chemical weapons proliferation in Iraq as follows,
 - Since Operation Desert Fox in December 1998, Baghdad has refused to allow United Nations inspectors into Iraq as required by Security Council Resolution 687. Although UN Security Council Resolution (UNSCR) 1284, adopted in December 1999, established a follow-on inspection regime to the United Nations Special Commission on Iraq (UNSCOM) in the form of the United Nations Monitoring, Verification, and Inspection Committee (UNMOVIC), there have been no UN inspections during this reporting period. Moreover, the automated video monitoring system installed by the UN at known and suspect WMD facilities in Iraq has been dismantled by the Iraqis. Having lost this on-the-ground access, it is difficult for the UN or the US to accurately assess the current state of Iraq's WMD programs.
 - Since the Gulf war, Iraq has rebuilt key portions of its chemical production infrastructure for industrial and commercial use, as well as its missile production facilities. It has attempted to purchase numerous dual-use items for, or under the guise of, legitimate civilian use. This equipment—in principle subject to UN scrutiny—also could be diverted for WMD purposes. Since the suspension of UN inspections in December 1998, the risk of diversion has increased.
 - Following Desert Fox, Baghdad again instituted a reconstruction effort on those facilities destroyed by the US bombing, to include several critical missile production complexes and former dual-use CW production facilities. In addition, it appears to be installing or repairing dual-use equipment at CW-related facilities. Some of these facilities could be converted fairly quickly for production of CW agents.
- A Department of Defense report in January 2001 reported that,
 - Since the Gulf War, Baghdad has rebuilt key portions of its industrial and chemical production infrastructure; it has not become a state party to the CWC. Some of Iraq's facilities could be converted fairly quickly to production of chemical warfare agents. Following Operation Desert Fox, Baghdad again instituted a rapid reconstruction effort on those facilities to include former dual-use chemical warfare-associated production facilities, destroyed by U.S. bombing. In 1999, Iraq may have begun installing or repairing dual-use equipment at these and other chemical war-fare-related facilities. Previously, Iraq was known to have produced and stockpiled mustard, tabun, sarin, and VX, some of which likely remain hidden. It is likely that an additional quantity of various precursor chemicals also remains hidden.
 - In late 1998, UNSCOM reported to the UN Security Council that Iraq continued to withhold information related to its chemical program. UNSCOM cited an example where Baghdad seized from inspectors a document discovered by UNSCOM inspectors, which indicated that Iraq had not consumed as many chemical munitions during the Iran-Iraq War as had been declared previously by Baghdad. This document suggests that Iraq may have an additional 6,000 chemical munitions hidden. Similarly, UNSCOM discovery in 1998 of evidence of VX in Iraqi missile warheads showed that Iraq had lied to the international community for seven years when it repeatedly said that it had never weaponized VX.
 - Iraq retains the expertise, once a decision is made, to resume chemical agent production within a few weeks or months, depending on the type of agent. However, foreign assistance, whether commercial procurement of dual-use technology, key infrastructure, or other aid, will be necessary to completely restore Iraq's chemical agent production capabilities to pre-Desert Storm levels. Iraqi doctrine for the use of chemical weapons evolved during the Iran-Iraq War, and was fully incorporated into Iraqi offensive operations by the end of the war in 1988. During different stages of that war, Iraq used aerial bombs, artillery, rocket launchers, tactical rockets, and sprayers mounted in helicopters to deliver agents against Iranian forces. It also used chemical agents against Kurdish elements of its own civilian population in 1988.
- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002:
 - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.
 - Iraq continues to build and expand an infrastructure capable of producing WMD. Baghdad is expanding its civilian chemical industry in ways that could be diverted quickly to CW production. We believe it also maintains an active and capable BW program; Iraq told UNSCOM it had worked with several BW agents.

Biological Weapons

- Had highly compartmented "black" program with far tighter security regulations than chemical program.
- Had 18 major sites for some aspect of biological weapons effort before the Gulf War. Most were nondescript and had no guards or visible indications they were a military facility.
- The US targeted only one site during the Gulf War. It struck two sites, one for other reasons. It also struck at least two targets with no biological facilities that it misidentified.

- Systematically lied about biological weapons effort until 1995. First stated that had small defensive efforts, but no offensive effort. In July, 1995, admitted had a major defensive effort. In October, 1995, finally admitted major weaponization effort.
- Iraq has continued to lie about its biological weapons effort since October, 1995. It has claimed the effort was headed by Dr. Taha, a woman who only headed a subordinate effort. It has not admitted to any help by foreign personnel or contractors. It has claimed to have destroyed its weapons, but the one site UNSCOM inspectors visited showed no signs of such destruction and was later said to be the wrong site. It has claimed only 50 people were employed full time, but the scale of the effort would have required several hundred.
- Since July 1995, Iraq has presented three versions of FFCDs and four “drafts.”
 - The most recent FFCD was presented by Iraq on 11 September 1997. This submission followed the UNSCOM’s rejection, of the FFCD of June 1996. In the period since receiving that report, UNSCOM conducted eight inspections in an attempt to investigate critical areas of Iraq’s proscribed activities such as warfare agent production and destruction, biological munitions manufacturing, filling and destruction, and military involvement in and support to the proscribed program. Those investigations, confirmed the assessment that the June 1996 declaration was deeply deficient. The UNSCOM concluded that the new FFCD, it received on 11 September 1997, contains no significant changes from the June 1996 FFCD
- Iraq has not admitted to the production of 8,500 liters of anthrax, 19,000 liters of Botulinum toxin, 2,200 liters of Aflatoxin,
- Reports indicate that Iraq tested at least 7 principal biological agents for use against humans.
- Anthrax, Botulinum, and Aflatoxin are known to be weaponized.
- Looked at viruses, bacteria, and fungi. Examined the possibility of weaponizing gas gangrene and Mycotoxins. Some field trials were held of these agents.
- Examined foot and mouth disease, haemorrhagic conjunctivitis virus, rotavirus, and camel pox virus.
- Conducted research on a “wheat pathogen” and a Mycotoxin similar to “yellow rain” defoliant.
- The “wheat smut” was first produced at Al Salman, and then put in major production during 1987-1988 at a plant near Mosul. Iraq claims the program was abandoned.
- The August 1995 defection of Lieutenant general Husayn Kamel Majid, formerly in charge of Iraq’s weapons of mass destruction, revealed the extent of this biological weapons program. Lt. General Kamel’s defection prompted Iraq to admit that it:
- Imported at least 39 tons of growth media (31,000 kilograms or 68,200 pounds) for biological agents obtained from three European firms. According to UNSCOM, 3,500 kilograms or 7,700 pounds) remains unaccounted for. Some estimates go as high as 17 tons. Each ton can be used to produce 10 tons of bacteriological weapons.
- Other reports indicate that Iraq obtained nearly 40 tons of the medium to grow anthrax and botulinum bacterium for its biological weapons program from Oxoid Ltd, and other suppliers in the UK in 1988.
 - Imported type cultures from the US which can be modified to develop biological weapons. Tried to import the Ames strain of Anthrax from the US but does not seem to have succeeded. Did import the Sterne and A-3 strains of Anthrax from the Institut Pasteur in France, and two Vollum strains and five other strains of Anthrax from the American Type Culture collection, located near Manassas, Virginia. Vollum 1B is the strain of Anthrax the US developed for its own biological weapons program before it signed the BWC.
 - Had a laboratory- and industrial-scale capability to manufacture various biological agents including the bacteria which cause Anthrax and botulism; Aflatoxin, a naturally occurring carcinogen; clostridium perfringens, a gangrene-causing agent; the protein toxin Ricin; tricothecene Mycotoxins, such as T-2 and DAS; and an anti-wheat fungus known as wheat cover smut. Iraq also conducted research into the rotavirus, the camel pox virus and the virus which causes haemorrhagic conjunctivitis.
 - Created at least seven primary production facilities including the Sepp Institute at Muthanna, the Ghazi Research Institute at Amaria, the Daura Foot and Mouth Disease Institute, and facilities at Al-Hakim, Salman Pak Taji, and Fudaliyah. According to UNSCOM, weaponization occurred primarily at Muthanna through May, 1987 (largely Botulinum), and then moved to Al Salman. (Anthrax). In March, 1988 a plant was open at Al Hakim, and in 1989 an Aflatoxin plant was set up at Fudaliyah.
 - Had test site about 200 kilometers west of Baghdad, used animals in cages and tested artillery and rocket rounds against live targets at ranges up to 16 kilometers.
 - Took fermenters and other equipment from Kuwait to improve effort during the Gulf War.

- Iraq had least 79 civilian facilities capable of playing some role in biological weapons production still in existence in 1997.
- The Iraqi program involving Aflatoxin leaves many questions unanswered.
 - Iraqi research on Aflatoxin began in May 1988 at Al Salman, where the toxin was produced by the growth of fungus *aspergillus* in 5.3 quart flasks.
 - The motives behind Iraq's research on Aflatoxin remain one of the most speculative aspects of its program. Aflatoxin is associated with fungal-contaminated food grains, and is considered non-lethal. It normally can produce liver cancer, but only after a period of months to years and in intense concentrations. There is speculation, however, that a weaponized form might cause death within days and some speculation that it can be used as an incapacitating agent.
 - Iraq moved its production of Aflatoxin to Fudaliyah in 1989, and produced 481 gallons of toxin in solution between November, 1988 and May, 1990.
 - Produced 1,850 liters of Aflatoxin in solution at Fudaliyah.
 - It produced a total of at least 2,500 liters of concentrated Aflatoxin (1,850 liters filled into munitions).
 - It developed 16 R-400 Aflatoxin bombs and two Scud warheads. Conducted trials with Aflatoxin in 122 mm rockets and R-400 bombs in November 1989 and May and August 1990. Produced a total of 572 gallons of toxin and loaded 410.8 gallons into munitions.
 - UNSCOM concluded in October, 1997, that Iraq's accounting for its Aflatoxin production was not credible.
- Total Iraqi production of more orthodox biological weapons reached at least 19,000 liters of concentrated Botulinum (10,000 liters filled into munitions); and 8,500 liters of concentrated Anthrax (6,500 liters filled into munitions):
- It manufactured 6,000 liters of concentrated Botulinum toxin and 8,425 liters of Anthrax at Al-Hakim during 1990; 5400 liters of concentrated Botulinum toxin at the Daura Foot and Mouth Disease Institute from November 1990 to January 15, 1991; 400 liters of concentrated Botulinum toxin at Taji; and 150 liters of concentrated Anthrax at Salman Pak.
- Iraq acknowledged to UN SCOM that it had produced at least 19,000 liters of botulinum toxin, using more than half to fill at least 116 bombs and missile warheads.
- Filled at least 50 bombs and missile warheads with a wet Anthrax agent using the Vollum strain, or one very similar.
- Some Al Hussein warheads were found at the Al-Nibal missile destruction site with traces of wet Anthrax agent, similar to the Vollum strain.
- Vials were found with a dry freeze-dried Anthrax agent of the Vollum strain; reports differ as to whether Iraq weaponized a dry clay coated of the particle size most lethal for delivering inhaled Anthrax, and clay coated the particles to eliminate the electrostatic charge and ensure optimal dispersion.
- Iraq is also known to have produced at least:
 - 340 liters of concentrated *clostridium perfringens*, a gangrene-causing biological agent, beginning in August 1990.
 - 10 liters of concentrated Ricin at Al Salam. Claim abandoned work after tests failed.
- Iraq weaponized at least three biological agents for use in the Gulf War. The weaponization consisted of at least:
 - 100 bombs and 16 missile warheads loaded with Botulinum.
 - 50 R-400 air-delivered bombs and 5 missile warheads loaded with anthrax; and
 - 4 missile warheads and 7 R-400 bombs loaded with Aflatoxin, a natural carcinogen.
 - The warheads were designed for operability with the Al Husayn Scud variant.
- Iraq had other weaponization activities:
 - Armed 155 mm artillery shells and 122 mm rockets with biological agents.
 - Conducted field trials, weaponization tests, and live firings of 122 mm rockets armed with Anthrax and Botulinum toxin from March 1988 to May 1990.
 - Tested Ricin, a deadly protein toxin, for use in artillery shells.
 - Iraq produced at least 191 bombs and 25 missile warheads with biological agents.

- Developed and deployed 250 pound aluminum bombs coverage in fiberglass. Bombs were designed so they could be mounted on both Soviet and French-made aircraft. They were rigged with parachutes for low altitudes drops to allow efficient slow delivery and aircraft to fly under radar coverage. Some debate over whether bombs had cluster munitions or simply dispersed agent like LD-400 chemical bomb.
- Deployed at least 166 R-400 bombs with 85 liters of biological agents each during the Gulf War. Deployed them at two sites. One was near an abandoned runway where it could fly in aircraft, arm them quickly, and disperse with no prior indication of activity and no reason for the UN to target the runway.
- Filled at least 25 Scud missile warheads, and 157 bombs and aerial dispensers, with biological agents during the Gulf War.
- Developed and stored drop tanks ready for use for three aircraft or RPV s with the capability of dispersing 2,000 liters of anthrax. Development took place in December 1990. Claimed later that tests showed the systems were ineffective.
- The UN found, however, that Iraq equipped crop spraying helicopters for biological warfare and held exercises and tests simulating the spraying of Anthrax spores.
- Iraqi Mirages were given spray tanks to disperse biological agents.
 - Held trials as late as January 13, 1991.
 - The Mirages were chosen because they have large 2,200 liter belly tanks and could be refueled by air, giving them a longer endurance and greater strike range.
 - The tanks had electric valves to allow the agent to be released and the system was tested by releasing simulated agent into desert areas with scattered petri dishes to detect the biological agent. UNSCOM has video tapes of the aircraft.
- Project 144 at Taji produced at least 25 operational Al Husayn warheads. Ten of these were hidden deep in a railway tunnel, and 15 in holes dug in an unmanned hide site along the Tigris.
- Biological weapons were only distinguished from regular weapons by a black stripe.
- The UN claims that Iraq has offered no evidence to corroborate its claims that it destroyed its stockpile of biological agents after the Gulf War. Further, Iraq retains the technology it acquired before the war and evidence clearly indicates an ongoing research and development effort, in spite of the UN sanctions regime.
- UNSCOM reported in October 1997 that:
 - Iraq has never provided a clear picture of the role of its military in its biological warfare program, and has claimed it only played a token role.
 - It has never accounted for its disposal of growth media. The unaccounted for media is sufficient, in quantity, for the production of over three times more of the biological agent -- Anthrax -- Iraq claims to have been produced.
 - Bulk warfare agent production appears to be vastly understated by Iraq. Expert calculations of possible agent production quantities, either by equipment capacity or growth media amounts, far exceed Iraq's stated results
 - Significant periods when Iraq claims its fermenters were not utilized are unexplained
 - Biological warfare field trials are underreported and inadequately described.
 - Claims regarding field trials of chemical and biological weapons using R400 bombs are contradictory and indicate that, "more munitions were destroyed than were produced.
 - The Commission is unable to verify that the unilateral destruction of the BW-filled Al Hussein warheads has taken place."
 - There is no way to confirm whether Iraq destroyed 157 bombs of the R400 type, some of which were filled with Botulin or anthrax spores.
 - "The September 1997 FFCD fails to give a remotely credible account of Iraq's biological program. This opinion has been endorsed by an international panel of experts."
- The current status of the Iraqi program is as follows (according to US intelligence as of February 19, 1998):

<u>Agent</u>	<u>Declared Concentrated Amount</u>		<u>Declared Total Amount</u>		<u>Uncertainty</u>
	<u>Liters</u>	<u>Gallons</u>	<u>Liters</u>	<u>Gallons</u>	
Anthrax	8500		12,245	85000	22457 Could be 3-4 times

					declared amount
Botulinum toxin	19,400	NA	380,000	NA	Probably twice declared amount. Some extremely concentrated.
Gas Gangrene Clostridium Perfringens	340	90	3,400	900	Amounts could be higher
Aflatoxin	NA	NA	2,200	581	Major uncertainties
Ricin	NA	NA	10	2.7	Major uncertainties

- UNSCOM cannot confirm the unilateral destruction of 25 warheads. It can confirm the destruction of 23 of at least 157 bombs. Iraq may have more aerosol tanks.
- UNSCOM used to inspect 79 sites -- 5 used to make weapons before war; 5 vaccine or pharmaceutical sites; 35 research and university sites; thirteen breweries, distilleries, and dairies with dual-purpose capabilities; eight diagnostic laboratories.
- Iraq retains laboratory capability to manufacture various biological agents including the bacteria which cause anthrax, botulism, tularemia and typhoid.
- Many additional civilian facilities are capable of playing some role in biological weapons production.
- A State Department spokesman reported on November 16, 1998 that there is a large discrepancy between the amount of biological growth media -procured and the amount of agents that were or could have been produced. Baghdad has not adequately explained where some 8,000 pounds (3,500 kg) of the material went out of some 68,000 pounds (31,000 kg) of biological growth media it imported. Iraq's accounting of the amount of the agent it produced and the number of failed batches is seriously flawed and cannot be reconciled on the basis of this full disclosure Iraq has made.
- The CIA reported in January 1999 that Iraq continues to refuse to disclose fully the extent of its BW program. After four years of denials, Iraq admitted to an offensive program resulting in the destruction of Al Hakam-a large BW production facility Iraq was trying to hide as a legitimate biological plant. Iraq still has not accounted for over a hundred BW bombs and over 80 percent of imported growth media-directly related to past and future Iraqi production of thousands of gallons of biological agent. This lack of cooperation is an indication that Baghdad intends to reconstitute its BW capability when possible.
- A State Department report in September 1999 noted that:
 - Iraq refuses to allow inspection of thousands of Ministry of Defense and Military Industries Commission documents relating to biological and chemical weapons and long-range missiles.
 - In 1995, Iraqis who conducted field trials of R-400 bombs filled with biological agents described the tests to UNSCOM experts in considerable detail, including the use of many animals. These field trials were reflected in Iraq's June 1996 biological weapons declaration. Yet, amazingly, Iraq now denies that any such trials were conducted at all.
 - In September 1995, Iraq finally declared the existence of two projects to disseminate biological agents from Mirage F-1 and MiG-21 aircraft, yet there is no evidence that the prototype weapons and aircraft were ever destroyed. There is also no evidence that the 12 Iraqi helicopter-borne aerosol generators for biological weapon delivery were ever destroyed.
 - Apart from one document referring to a single year, no Iraqi biological weapon production records have been given to the UN—no records of storage, of filling into munitions, or of destruction. This is why UNSCOM refers to Iraq's biological weapons program—which deployed SCUD missile warheads filled with anthrax and botulinum toxin to be ready for use against Coalition forces—as a “black hole.”
 - The Iraqis have repeatedly changed their story about their biological weapons warheads. Iraq has revised several times its declarations regarding the precise locations of warhead destruction and the fill of warheads. The movements of concealed warheads prior to unilateral destruction, claimed by Iraq, have been proven to be false.
- The DCI Nonproliferation Center (NPC) reported in February 2000 that “We do not have any direct evidence that Iraq has used the period since Desert Fox to reconstitute its WMD programs, although given its past behavior, this type of activity must be regarded as likely. The United Nations assesses that Baghdad has the capability to reinitiate both its CW and BW programs within a few weeks to months, but without an inspection monitoring program, it is difficult to determine if Iraq has done so.”

- Iraqi defector claims in February 2000 that Iraq had maintained a missile force armed with chemical and biological warheads that can be deployed from secret locations, and they that warheads are stored separately near Baghdad and have been deployed to the missiles in the field in exercises.ⁱⁱⁱ
- George Tenet, the Director of the CIA, testified before the Senate Foreign Relations Committee on March 20, and identified Iraq as a key country seeking biological weapons.
- A CIA report in August 2000 summarized the state of biological weapons proliferation in Iraq as follows:^{iv}
 - Since Operation Desert Fox in December 1998, Baghdad has refused to allow United Nations inspectors into Iraq as required by Security Council Resolution 687. Although UN Security Council Resolution (UNSCR) 1284, adopted in December 1999, established a follow-on inspection regime to the United Nations Special Commission on Iraq (UNSCOM) in the form of the United Nations Monitoring, Verification, and Inspection Committee (UNMOVIC), there have been no UN inspections during this reporting period. Moreover, the automated video monitoring system installed by the UN at known and suspect WMD facilities in Iraq has been dismantled by the Iraqis. Having lost this on-the-ground access, it is difficult for the UN or the US to accurately assess the current state of Iraq's WMD programs.
 - Since the Gulf war, Iraq has rebuilt key portions of its chemical production infrastructure for industrial and commercial use, as well as its missile production facilities. It has attempted to purchase numerous dual-use items for, or under the guise of, legitimate civilian use. This equipment—in principle subject to UN scrutiny—also could be diverted for WMD purposes. Since the suspension of UN inspections in December 1998, the risk of diversion has increased.
 - Following Desert Fox, Baghdad again instituted a reconstruction effort on those facilities destroyed by the US bombing, to include several critical missile production complexes and former dual-use CW production facilities. In addition, it appears to be installing or repairing dual-use equipment at CW-related facilities. Some of these facilities could be converted fairly quickly for production of CW agents.
 - UNSCOM reported to the Security Council in December 1998 that Iraq continued to withhold information related to its CW and BW programs. For example, Baghdad seized from UNSCOM inspectors an Air Force document discovered by UNSCOM that indicated that Iraq had not consumed as many CW munitions during the Iran-Iraq War in the 1980s as had been declared by Baghdad. This discrepancy indicates that Iraq may have an additional 6,000 CW munitions hidden.
 - We do not have any direct evidence that Iraq has used the period since Desert Fox to reconstitute its WMD programs, although given its past behavior, this type of activity must be regarded as likely. We assess that since the suspension of UN inspections in December of 1998, Baghdad has had the capability to reinitiate both its CW and BW programs within a few weeks to months, but without an inspection monitoring program, it is difficult to determine if Iraq has done so. We know, however, that Iraq has continued to work on its unmanned aerial vehicle (UAV) program, which involves converting L-29 jet trainer aircraft originally acquired from Eastern Europe. These modified and refurbished L-29s are believed to be intended for delivery of chemical or biological agents.
- A Department of Defense report in January 2001 stated that Iraq's continued refusal to disclose fully the extent of its biological program suggests that Baghdad retains a biological warfare capability, despite its membership in the BWC. After four and one-half years of claiming that it had conducted only "defensive research" on biological weapons Iraq declared reluctantly, in 1995, that it had produced approximately 30,000 liters of bulk biological agents and/or filled munitions. Iraq admitted that it produced anthrax, botulinum toxins and aflatoxins and that it prepared biological agent-filled munitions, including missile warheads and aerial bombs. However, UNSCOM believed that Iraq had produced substantially greater amounts than it has admitted—three to four times greater. Iraq also admitted that, during the Persian Gulf War, it had deployed biological agent-filled munitions to air-fields and that these weapons were intended for use against Israel and coalition forces in Saudi Arabia. Iraq stated that it destroyed all of these agents and munitions in 1991, but it has provided insufficient credible evidence to support this claim. The UN believes that Baghdad has the ability to reconstitute its biological warfare capabilities within a few weeks or months, and, in the absence of UNSCOM inspections and monitoring during 1999 and 2000, we are concerned that Baghdad again may have produced some biological warfare agents.
- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002:
 - We believe Baghdad continues to pursue ballistic missile capabilities that exceed the restrictions imposed by UN resolutions. With substantial foreign assistance, it could flight-test a longer-range ballistic missile within the next five years. It may also have retained the capability to deliver BW or CW agents using modified aircraft or other unmanned aerial vehicles.

- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence: February 6, 2002: Iraq continues to build and expand an infrastructure capable of producing WMD. Baghdad is expanding its civilian chemical industry in ways that could be diverted quickly to CW production. We believe it also maintains an active and capable BW program; Iraq told UNSCOM it had worked with several BW agents.
- John R. Bolton, Under Secretary for Arms Control and International Security described Iraq's status as follows in a speech on May 6, 2002: "Foremost is Iraq. Although it became a signatory to the BWC in 1972 and became a State Party in 1991, Iraq has developed, produced, and stockpiled biological warfare agents and weapons. The United States strongly suspects that Iraq has taken advantage of more than three years of no UN inspections to improve all phases of its offensive BW program. Iraq also has developed, produced, and stockpiled chemical weapons, and shown a continuing interest in developing nuclear weapons and longer range missiles."

Nuclear Weapons

- Inspections by UN teams have found evidence of two successful weapons designs, a neutron initiator, explosives and triggering technology needed for production of bombs, plutonium processing technology, centrifuge technology, Calutron enrichment technology, and experiments with chemical separation technology. Iraq had some expert technical support, including at least one German scientist who provided the technical plans for the URENCO TC-11 centrifuge.
- Iraq's main nuclear weapons related facilities were:
 - Al Atheer - center of nuclear weapons program. Uranium metallurgy; production of shaped charges for bombs, remote controlled facilities for high explosives manufacture.
 - Al Tuwaitha - triggering systems, neutron initiators, uranium metallurgy, and hot cells for plutonium separation. Laboratory production of UO_2 , UCL_4 , UF_6 , and fuel fabrication facility. Prototype-scale gas centrifuge, prototype EMIS facility, and testing of laser isotope separation technology.
 - Al Qa Qa - high explosives storage, testing of detonators for high explosive component of implosion nuclear weapons.
 - Al Musaiyib/Al Hatteen - high explosive testing, hydrodynamic studies of bombs.
 - Al Hadre - firing range for high explosive devices, including FAE.
 - Ash Sharqat - designed for mass production of weapons grade material using EMIS.
 - Al Furat - designed for mass production of weapons grade material using centrifuge method.
 - Al Jesira (Mosul) - mass production of UCL_4 .
 - Al Qaim - phosphate plant for production of U3O8 .
 - Akashat uranium mine.
- Iraq had three reactor programs:
 - Osiraq/Tammuz I 40 megawatt light-water reactor destroyed by Israeli air attack in 1981.
 - Isis/Tammuz II 800 kilowatt light water reactor destroyed by Coalition air attack in 1991.
 - IRT-5000 5 megawatt light water reactor damaged by Coalition air attack in 1991.
- Iraq used Calutron (EMIS), centrifuges, plutonium processing, chemical defusion and foreign purchases to create new production capability after Israel destroyed most of Osiraq.
- Iraq established a centrifuge enrichment system in Rashidya and conducted research into the nuclear fuel cycle to facilitate development of a nuclear device.
- After invading Kuwait, Iraq attempted to accelerate its program to develop a nuclear weapon by using radioactive fuel from French and Russian-built reactors. It made a crash effort in September, 1990 to recover enriched fuel from its supposedly safe-guarded French and Russian reactors, with the goal of producing a nuclear weapon by April, 1991. The program was only halted after Coalition air raids destroyed key facilities on January 17, 1991.
- Iraq conducted research into the production of a radiological weapon, which disperses lethal radioactive material without initiating a nuclear explosion.
 - Orders were given in 1987 to explore the use of radiological weapons for area denial in the Iran-Iraq War.
 - Three prototype bombs were detonated at test sites -- one as a ground level static test and two others were dropped from aircraft.
 - Iraq claims the results were disappointing and the project was shelved but has no records or evidence to prove this.

- UN teams have found and destroyed, or secured, new stockpiles of illegal enriched material, major production and R&D facilities, and equipment-- including Calutron enriching equipment. The IAEA carried out more than 500 site inspections during its time in Iraq, destroyed more than 50,000 square meters of factory space, 2,000 equipment items and 600 metric tons of special alloys. It put all known stocks of Uranium compounds under IAEA control.
- UNSCOM believes that Iraq's nuclear program has been largely disabled and remains incapacitated, but warns that Iraq retains substantial technology and established a clandestine purchasing system in 1990 that it has used to import forbidden components since the Gulf War.
- The major remaining uncertainties are:
 - Iraq still retains the technology developed before the Gulf War and US experts believe an ongoing research and development effort continues, in spite of the UN sanctions regime.
 - Did Iraq conceal an effective high speed centrifuge program.
 - Are there elements for radiological weapons.
 - Is it actively seeking to clandestinely buy components for nuclear weapons and examining the purchase of fissile material from outside Iraq.
 - Is it continuing with the development of a missile warhead suited to the use of a nuclear device.
 - A substantial number of declared nuclear weapons components and research equipment has never been recovered. There is no reason to assume that Iraqi declarations were comprehensive.
- The IAEA findings at the end of the IAEA effort were:
 - There were no indications of successful development of nuclear weapons.
 - However, no documentation exists to show the final status of the weapons effort at the time it was interrupted.
 - Iraq was closed to success in production of HEU through the EMIS process, had produced and carried out pilot cascading of single cylinder subcritical gas centrifuge machines, and fabrication of the explosive package for a nuclear weapon and associated electronics.
 - All known imported and indigenous Uranium compounds are in the custody of the IAEA, and all known indigenous facilities capable of producing amounts of uranium compounds useful to a nuclear weapons effort have been destroyed.
 - There are no indications that Iraq produced more than a few grams of weapons-usable material, all of which has been removed from Iraq. All safeguard material Iraq had diverted to its "crash" weapons effort has been verified and removed from Iraq, including all safeguard research reactor fuel. There are no indications that Iraq has acquired weapons grade material from any other sources.
 - All relevant single-use industrial scale enrichment production and research equipment has been destroyed. All known dual-use equipment is subject to ongoing monitoring and verification.
 - All EMIS-related facilities and equipment have been destroyed.
- Work by David Albright indicates that Iraq still holds approximately 1.7 metric tons (MT) of low-enriched uranium (LEU) and several hundred MT of natural uranium. He estimates that if Iraq should master one of the uranium enrichment technologies that it was pursuing before the Gulf War, its LEU stock would provide a means to rapidly make enough HEU for at least one nuclear weapon, and that the natural uranium could become the feedstock for many more. This uranium remains in Iraq because the UN Action Team did not have a mandate under resolution 687 to "remove, destroy or render harmless" this uranium. Without further enrichment or irradiation in a nuclear reactor, it is not "weapons-usable nuclear material."
- Dr. Khidhir Hamza a highest-ranking Iraqi scientist who defected from Iraq claims Iraqi scientists were commanded to build one nuclear bomb immediately after Saddam invaded Kuwait in 1990, and that the resulting device was crude and untested and might even could fall apart. In an April 2, 2001 edition of Middle East Forum Wire, he says that,
 - Iraq still runs its nuclear program and distributes its nuclear program infrastructure among dozens of small corporations, as it does with biological and chemical weapons.
 - One group was responsible for enrichment of uranium by diffusion, and did this under the front of a large refinery in Baghdad. A refinery and a uranium enrichment plant require similar piping, structures, compressors, and handling of gases. He says

- His assistant, who designed bombs under Hamza, is now running the program while also doing seismic prospecting for oil maps. Apart from designing weapons, he engineers underground explosions that generate seismic waves in order to locate oil. When an inspector visits, all programs relating to the bomb design are put aside, and replaced with seismic prospecting maps. The bomb designer is a real expert at seismic prospecting, so he is very convincing to the inspectors.
- In a 1998, New York Times interview, he stated that Iraq was three years away from nuclear capability. Sadly, inspections ceased that same year. Three years have passed, and Saddam is undoubtedly on the precipice of nuclear power.
- He now estimates that Iraq will have between three to five nuclear weapons by 2005. Iraq now has twelve tons of uranium and 1.3 tons of low enriched uranium. This is enough for at least four bombs already.
- IAEA inspectors feel that Iraqi exiles have little credibility, but note that there is no way to detect basic weapons research, development and testing of weaponization electronics, further work on explosive packages for weapons, simulations using depleted Iranium, development and testing of single centrifuges and experimental cascades, and development of Uranium casting and machine techniques using depleted Uranium.
- The CIA reported in January 1999 that Iraq continues to hide documentation, and probably some equipment, relating to key aspects of past nuclear activities. After years of Iraqi denials, the IAEA was able to get Iraq to admit to a far more advanced nuclear weapons program and a project based on advanced uranium enrichment technology. However, Baghdad continues to withhold significant information about enrichment techniques, foreign procurement, and weapons design.
- The DCI Nonproliferation Center (NPC) reported in February 2000 and August 2000 that “We do not have any direct evidence that Iraq has used the period since Desert Fox to reconstitute its WMD programs, although given its past behavior, this type of activity must be regarded as likely. The United Nations assesses that Baghdad has the capability to reinstate both its CW and BW programs within a few weeks to months, but without an inspection monitoring program, it is difficult to determine if Iraq has done so.”
- Press reports in February 2000 claimed that Iraq might have developed biological warfare agents it had kept secret from UNSCOM inspectors and which were never discovered. The reports followed similar warnings by UNSCOM experts on January 25, 2000 that Iraq might have done so, that not all suspected biological weapons production and research facilities had been inspected, and that the undiscovered weapons might include infectious viral agents.v
- George Tenet, the Director of the CIA, testified before the Senate Foreign Relations Committee on March 20, 2000 and stated that, “We are concerned about the potential for states and terrorists to acquire plutonium, highly enriched uranium, and other fissile materials, and even complete nuclear weapons...Iran or Iraq could quickly advance their nuclear aspirations through covert acquisition of fissile material or relevant technology.”
- A Department of Defense report in January 2001 stated that,
 - Despite these severe pressures on its economy, Saddam Hussein’s government continues to devote Iraqi resources to rebuilding certain portions of its development program that was focused on building an implosion-type device. The program was linked to a ballistic missile project that was the intended delivery system. From April 1991 to December 1998, Iraqi nuclear aspirations were held in check by IAEA/ UNSCOM inspections and monitoring. All known weapons-grade fissile material was removed from the country.
 - Although Iraq claims that it destroyed all of the specific equipment and facilities useful for developing nuclear weapons, it still retains sufficient skilled and experienced scientists and engineers as well as weapons design information that could allow it to restart a weapons program.
 - Iraq would need five or more years and key foreign assistance to rebuild the infrastructure to enrich enough material for a nuclear weapon. This period would be substantially shortened should Baghdad successfully acquire fissile material from a foreign source.
- The CIA estimated in January 2002 that Baghdad had a crash program to develop a nuclear weapon for missile delivery in 1990, but coalition bombing and IAEA and UNSCOM activities significantly set back the effort. The Intelligence Community estimates that Iraq, unconstrained, would take several years to produce enough fissile material to make a weapon. Iraq has admitted to having biological and chemical weapons programs before the Gulf war and maintains those programs.
- Director of Central Intelligence George J. Tenet’s testimony before the Senate Select Committee on Intelligence: February 6, 2002: We believe Saddam never abandoned his nuclear weapons program. Iraq retains a significant number of nuclear scientists, program documentation, and probably some dual-use manufacturing infrastructure that could support a reinvigorated nuclear weapons program. Baghdad’s access to foreign expertise could support a rejuvenated program, but our major near-term concern is the possibility that Saddam might gain access to fissile material.

Source: Prepared by Anthony H. Cordesman, Arleigh A. Burke Chair in Strategy, CSIS.

ⁱ New York Times, February 1, 2000.

ⁱⁱ London Sunday Times, February 21, 2000.

ⁱⁱⁱ London Sunday Times, February 21, 2000.

^{iv} CIA, August 10, 2000, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999 internet edition.

^v Associated Press, February 9, 2000, 0154; Washington Post, February 10, 2000, p. A-23; New York Times International, February 8, 2000.